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Note.—Initial abstracts are written by the following:

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* General studies, see also individual crops.

Plant Breeding Abstracts

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Part I. Empire Section

*STATISTICS 519

941. BARNARD, G. A. 519.24
Significance tests for 2×2 tables.
Biometrika 1947: 34: 123-38.

A discussion is presented on the various types of experiment whose results may be recorded in a 2×2 table. It is pointed out that significance tests appropriate for one type of experiment may be inappropriate for another. A special test is developed for " 2×2 comparative trials".

942. BARNARD, G. A. 519.24
The meaning of a significance level.
Biometrika 1947: 34: 179-82.

In this discussion of the meaning that is attached to significance levels, an example is analysed in the light of Levy's concept of an experimental "isolate".

943. ELFVING, G. 519.24
The asymptotical distribution of range in samples from a normal population.
Biometrika 1947: 34: 111-19.

The asymptotical distribution of the range of samples has been investigated for $n \rightarrow \infty$.

944. GEARY, R. C. 519.24
The frequency distribution of $\sqrt{b_1}$ for samples of all sizes drawn at random from a normal population.
Biometrika 1947: 34: 68-97.

Frequency distributions of $\sqrt{b_1}$ have been derived for normal random samples of $n = 3, 4, 5, 6, 7$ and 8, respectively. What degree of confidence can be attached to the author's method of computation is discussed in a final section.

945. GEARY, R. C. and 519.24
WORLLEDGE, J. P. G.
On the computation of universal moments of tests of statistical normality derived from samples drawn at random from a normal universe. Application to the calculation of the seventh moment of b_2 .
Biometrika 1947: 34: 98-110.

A method of computing moments of b_2 is described and illustrated by a computation of the seventh moment. The method can be checked at every stage.

946. LORD, E. 519.24
The use of range in place of standard deviation in the t -test.
Biometrika 1947: 34: 41-67.

The value of the u -test based on range instead of "Student's" t -test is indicated. Percentage points of the distribution of $u = u(m, n)$ have been computed for various values of m .

947. PEARSON, E. S. 519.24
The choice of statistical tests illustrated on the interpretation of data classed in a 2×2 table.
Biometrika 1947: 34: 139-63.

BARNARD, G. A.
 2×2 . A note on E. S. Pearson's paper.
Ibid. 1947: 34: 168-69.

A discussion is presented of the principles involved in choosing statistical tests for the

* General studies, see also individual crops.

interpretation of experimental data. The argument is illustrated with reference to data classifiable in a 2×2 table.

948. PLACKETT, R. L. 519.24

Limits of the ratio of mean range to standard deviation.

Biometrika 1947: 34: 120-22.

The limits of d_n , the ratio of mean w_n in samples of n to population standard deviation σ ,

are zero and $n \sqrt{\left(\frac{2}{(2n-1)!} \{(2n-2)! - [(n-1)!]^2\}\right)}$ respectively.

949. SILLITTO, G. P. 519.24

The distribution of Kendall's τ coefficient of rank correlation in rankings containing ties.

Biometrika 1947: 34: 36-40.

The distribution of Kendall's coefficient τ has been worked out for cases in which two or more members of one of the two rankings are graded equal.

950. WELCH, B. L. 519.24

The generalization of "Student's" problem when several different population variances are involved.

Biometrika 1947: 34: 28-35.

In this treatment of a generalization of "Student's" problem involving several different population variances, reference is also made to the treatment by Jeffreys and by Fisher of Behren's solution.

951. WISHART, J. 519.24

The cumulants of the z and of the logarithmic χ^2 and t distribution.

Biometrika 1947: 34: 170-78.

Expressions have been derived for the cumulants of the distribution of $\frac{1}{2} \log (\chi^2/n)$ and of Fisher's z .

952. GHOSH, B. 519.24:631.421

Measures of heterogeneity in agricultural and similar fields, and their inter-relations.

Sci. and Cult. 1946: 11: 382-83.

Methods of analysing heterogeneity of crop yields due to differences in soil fertility are briefly considered.

***BREEDING 575**

953. HUDSON, P. S. 575:633

How new crops are found.

Countryman 1946: 34: 43-46.

In this brief review of the principal plant breeding methods, the author describes firstly selection, exemplified by the production of the sweet lupin, then hybridization, in the light of Mendelism and the chromosome theory of inheritance, and finally the theories of Lysenko, who maintains that the hereditary constitution of plants may be modified by the environment.

954. BELL, G. D. H. 575:633(42)

Crops and plant breeding.

J. R. Agric. Soc. 1946: 107: 1-15.

In this review of English crops and plant breeding studies, reference is made to grassland improvement, red and white clover strains, wheat and barley trials, potato sports, the susceptibility of sugar beet to virus yellows, and trials of swede strains. Most of the papers reviewed of interest to plant breeders have already been noticed in *Plant Breeding Abstracts*.

* General studies, see also individual crops.

955.

575:633(62.67)

Annual Report of the Department of Agriculture, Colony and Protectorate of Kenya 1945 (1946): Pp. 125.

Wheat

At Njoro, strains of the following new hybrids are now under trial and multiplication: Cross 291 [Australian 26.A x 58.F.(L.1.)]; Cross 261 (68.E.12.A.1 x Reliance); Cross 294 (Australian 26.A x 117.A.); Cross 184 (Reliance x 73.D.21.I.1); and Cross No. 318 (rust resistant selection of D.C. x Ceres 721 x 112.E.8.L.5).

F₄ strains of the following hybrids have been selected: Cross No. 337 (223.F.1.A.3 x 291.J.1.B.1); Cross No. 344 (279.I.5.F.2 x 291.J.1.B.1); and Cross No. 350 (223.F.1.A.5 x 294.M.7.C.8).

Promising F₂ selections have been obtained from Cross 357 (184.P.2.A.1.E. x 294.AN.4.A.1) and Cross 359 (184.P.2.A.1.E x 291.J.1.I.1), which combine the quality of yield of 184 and the straw strength of 294.

The cross Warigo x 291.J.1.I.1 is being studied with a view to combining the leaf rust resistance of Warigo with the stem rust resistance of 291.

A number of other crosses are also under observation.

At the Scott Agricultural Laboratories, F₄ strains of Cross 338 [192.Q.2.A.(L) x Australian 27/2.2.1.5] are to be continued; they possess a fairly high degree of leaf rust resistance, but are less resistant to stem rust.

Barley

Tests of Kenia, Glacier C.I.6976, Camton and other introduced varieties have been conducted.

Potato

It has been found that potato breeding in Kenya need not be based on forms with the short day reaction. Sebago and other American varieties which have attained a commercial standard as far south as Florida are to be used in breeding for blight immunity. *Solanum andigenum* potatoes, procured from the Empire Potato Collection, have been used as male parents in crosses with established domestic *S. tuberosum* varieties. The possibility of further back-crossing is limited by the pollen sterility of the F₁ hybrids, but a few F₁ hybrids produced pollen late in the year, and these may provide material for back-crossing. The female parents used in the crosses were Skerry Blue, Up-to-Date, Craig's Defiance and two native varieties; the flavour of these interspecific hybrids appears to excel that of the domestic varieties at present available.

Information is also given on the performance of consignments of blight immune potatoes from various sources.

Coffee

Selection for high yield, good beans and satisfactory quality has been continued. At the Scott Agricultural Laboratories, the grafted progeny of many of the parent selections have yielded good crops, indicating that high yield is a heritable character. At the sub-station of Kentmere Estate, Kiambu, selection has been continued to find a type without the characteristic flavour of the coffee from the Upper Kiambu area; tree K20 shows promise in this respect, and it is to be multiplied by asexual and sexual methods. Seed of certain types received from the Belgian Congo have proved to be highly resistant to *Colletotrichum coffeanum*.

956.

575:633(68.9)

Annual Report of the Department of Agriculture, Northern Rhodesia 1945 (1946): Pp. 28.

Wheat

Trials were carried out on winter wheat.

Rice

Trials are being conducted with a view to obtaining a quick maturing type which will yield satisfactorily at higher altitudes.

Eleusine

Varietal trials of selected strains of *Eleusine coracana* were continued in the Northern Province.

Kaffir corn

Selection of local kaffir corn has been begun in the Western Province.

Forage grasses

The following local and introduced species are under trial at the Kambowa Agricultural Station: *Paspalum scrobiculatum*, *Paspalidium* sp., *Pennisetum polystachyon*, *Pennisetum purpureum*, giant Rhodes grass, kikuyu, *Paspalum dilatatum*, and *Cynodon plectostachyum*.

Cassava

Work on mosaic resistant types was continued at the Lanza Agricultural Station. The local mosaic resistant selection C.4 again proved superior to all other varieties under test.

957.

575:633(71)

Report of the Minister of Agriculture for the Dominion of Canada for the year ended March 31, 1946: Pp. 235.

Wheat

Selections of the cross McMurachy x (Warden x Hybrid English) have shown considerable root-rot resistance in tests at Winnipeg; Carleton and Stewart have also exhibited root rot resistance.

In field and greenhouse tests of bunt resistance at the Saskatoon Station, Apex was the most resistant variety.

The new Rescue variety was distributed on account of its stem sawfly resistance (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 1053).

The distribution of the new rust resistant variety Redman is reported (cf. *Plant Breeding Abstracts*, Vol. XVII, Abst. 17).

Spring wheat breeding is receiving attention; a promising new hybrid variety is being propagated at the Indian Head Experimental Farm.

A new rust resistant, high-yielding white spring wheat, designated 2780A, is also being increased; this variety should prove valuable to the cake and pastry trade, which requires a flour low in protein content; it may also be valuable for feeding livestock.

In breeding improved winter wheats for Ontario and southern Alberta, winter hardiness and disease resistance have been the chief objectives; a new variety designated Ott. 2619A has been developed, which is high-yielding, strong in the straw and fairly winter hardy, and which produces a flour suitable for cake and pastry making. Ott. 2619A is also bunt resistant, and moderately resistant to stem and leaf rust and loose smut; it has been crossed with a variety possessing a high degree of resistance to leaf rust to improve its resistance to this disease.

Triticum-Agropyron hybrids

Some advanced generation line selections of the crosses Kharkov x *A. elongatum* and Vernal Emmer x *A. elongatum* have reached a fair degree of stability, and resemble the wheat parents in many characters.

New amphidiploids are being developed, one of the most promising of which originated from the cross Kubanka x *A. glaucum*. A previously obtained amphidiploid of the cross *T. turgidum* x *A. glaucum* has proved to be highly productive and drought resistant under conditions at an experimental station in South Africa.

Oats

The new variety Beaver has been distributed (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 1019).

The variety No. 601 may eventually supersede Beaver in some regions. It is believed to be resistant to all known races of crown rust in Canada, and to most races of stem rust; in addition it shows marked resistance to lodging.

Attempts have been made to develop an oat capable of resisting all races of leaf and stem rust; hybrid No. 1692, developed at the Winnipeg Laboratory, is particularly promising. Work has been carried out to develop an early ripening, strong strawed, high yielding

variety for central Alberta; the most promising selection so far obtained has been named Larain (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 1019).

Varietal tests of oats for pasture purposes were continued. Roxton and 601 are recommended for summer pasture in eastern Canada.

A promising selection of the cross Vanguard x Erban, designated 2806K, has proved superior to Beaver, which originated from the same cross, in tests at the Charlottetown Experimental Station. Improved strains of hull-less oats are also under investigation.

Maize

The new early hybrids, Canbred 150 and Canbred 250, have been distributed; and it is expected that new hybrids superior to these two Canbred hybrids will shortly be available for multiplication and distribution.

The new early maturing hybrid No. 458, produced at Harrow, Ontario, is outstanding for its high yield.

Barley

Promising powdery mildew resistant selections have been obtained.

Resistance to stem and leaf rust and loose smut, strength of straw and non-shattering are receiving attention in breeding work at the Brandon Experimental Farm.

Forage grasses

The new timothy strain, designated Ottawa 1956-13, shows promise; it is a leafy hay type. Selection of reed canary grass is reported.

Breeding work on cocksfoot and perennial rye grass is to be further expanded at the Summerland Station. A world wide collection of meadow fescue strains was supplied to this station by the Division of Forage Plants so that selection may be carried out.

The Horton and Midsummer rye grass varieties are recommended for early spring pasture.

Forage legumes

Ladino white clover selections are under observation.

The production of double cross hybrids of lucerne is receiving attention, the principles used being similar to those applied in maize breeding; single crosses are to be tested in 1947. Selection of lucerne for crown rot resistance is reported from the Dominion Forage Crops Laboratory, Saskatoon.

In view of the difficulties of seed production of alsike clover (*Trifolium hybridum*), breeding investigations on this species have been begun.

A red clover breeding programme has been initiated at Fredericton.

Swede

Breeding for club root resistance is in progress at the Central Experimental Farm, Ottawa.

Hybridization of the most resistant swedes and most resistant turnips was continued; a number of highly resistant lines have been isolated, which are to be further tested.

Breeding work on club root resistance has also been begun at Nappan, N.S.

Potato

Tubers of species and varieties in the Empire Potato Collection are under test for resistance to bacterial ring rot.

New seedlings tested at the Fredericton Experimental Station have shown freedom from leaf roll disease; some of these seedlings are also resistant to mild mosaic, late blight and common scab; a few possess satisfactory commercial qualities. A number of seedlings tested during the past five years have also proved to be highly unattractive to the aphid, *Myzus persicae* Sulz.; a combination of aphid resistance and virus resistance is being sought. Hybrids between *S. demissum* and commercial potato varieties and back-cross progenies were tested for the resistance of their foliage to *Phytophthora infestans*; about 25% of the seedlings exhibited resistance. Tuber resistance and foliage resistance were not found to be correlated. The high degree of scab resistance of certain seedlings bred for resistance to this disease was confirmed; the tubers of some blight resistant seedlings also showed satisfactory scab resistance.

The introduction by the Lacombe Experimental Station of the new medium early Canus variety is reported.

***Linum usitatissimum* L.**

Two selections of linseed flax from the cross Argentine 8C x Redwing, tested in the Prairie Provinces for the past four years, have shown good yielding capacity and immunity to rust; their iodine number has also been found to be appreciably higher than that of Royal. Linseed and fibre varieties have been analysed for fibre content; Redwing was found in some cases to be as high in total fibre content as the fibre types.

Tobacco

Haranova, a Burley variety recently developed at Harrow, is extremely resistant to black root rot; in 1945 it became the leading cigarette Burley variety in Ontario. New Kentucky strains were tested, of which strains 19 and 52 showed particular promise; both strains are resistant to black root rot; strain 19 is a wrapper type of tobacco which may be suitable for export. Black root rot resistance in flue-cured tobacco is also receiving attention.

Sunflower

At Morden, an F_1 hybrid outyielded the Sunrise variety by 41% and matured eight days earlier.

The single cross hybrid produced by natural crossing between the strain S-37-388 of Mennonite and Sunrise at Saskatoon has exhibited superiority over the parent varieties in several characters; it has been named Advance.

Asclepias

Attempts to secure interspecific and intervarietal crosses through artificial crossing were continued; few, if any, successful results were obtained. Natural crossing between *A. syriaca* and *A. speciosa* has occurred in experimental plots. The number of flowers per umbel in *A. syriaca* has been found to be a heritable character. Analysis of the rubber content of *A. syriaca* leaves showed a variation between clones ranging from 2.1 to 3.3%. Histological investigations of aborting pods of *A. syriaca* indicated that ovule abnormalities accompanied pod collapse; certain types of ovule abortion appear to be comparable to the somatoplastic sterility described in lucerne and other plants.

Taraxacum Kok-saghyz

Hybridization and selection were continued in the attempt to secure a vigorous uniform strain with high rubber content. Out of the 3500 plants tested for rubber content, 386 had a rubber content of over 12%. Previously obtained tetraploid material is being increased, so that diploids and tetraploids of the same parentage can be compared.

Fruits

Promising apple selections have been secured at Fredericton, two of which were derived from the cross McIntosh x Lobo; these are attractive early winter apples of high quality. A mid-winter Fameuse type of apple and an early winter apple, with good quality and appearance, originated from an open-pollinated cross of McIntosh.

Introduced pear varieties developed at Ottawa are recommended on account of their hardiness and resistance to fire-blight.

Canning tests with recently developed apricot and peach varieties were carried out at the Summerland Station.

Promising selections of apricot, apple, plum and sour cherry have been developed at Morden.

Morden 119, a seedling of the Sapa cherry plum from the South Dakota Experiment Station, has been named Manor.

Interspecific hybridization of *Prunus* has been carried out at the Forest Nursery Station, Saskatchewan. Promising selections included F_2 seedlings of the cross cherry x sand cherry and F_2 seedlings of the parentage apricot x sand cherry x plum.

Crosses involving the raspberry varieties, Gatineau, Madawaska, Ottawa, Rideau, Trent, O-263 and two unnamed seedlings were made with a view to developing improved early varieties.

Strawberry and loganberry breeding is in progress at Saanichton, B.C.

A large number of intervarietal blueberry hybrids have been planted for further study at the Kentville Station.

Melon

The results of a study on crossing technique at the Morden Station are summarized.

Tomato

At the Normandin Experimental Station, Quebec, selections of hybrids between Bison and Bonton have proved superior to the 20 other varieties tested, with regard to earliness and yield.

A yellow-fruited mutation from the cross Bestal x Round Smooth has been named Morden (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 1399). Several red-fruited tomatoes with the bush habit have also been developed at the Morden Station. The value of F_1 hybrids is under investigation; the F_1 hybrid of Early Chatham x Bounty is mentioned as combining vigour and several other desirable characters. Pollen sterile lines of Early Chatham are under observation as possible seed parents in the production of F_1 hybrids.

Improved selections of L 3700 have been obtained at the Lethbridge Experimental Station. At Summerland a promising new variety has been named Splendid.

Pea

Promising new field pea varieties are to be increased, which may replace Arthur.

The variety Tiny, developed at Ottawa, is creating interest, as a small sized pea suitable for canning.

Soya bean

In a test of varietal resistance to brown spot caused by *Septoria Glycinis*, Harman and the unnamed selection, Harrow A, were the least susceptible.

Seed of the new Capital variety was multiplied by the Division of Forage Plants. The variety is high yielding and excellent in type, and it has a wide adaptability; it is believed that Capital will be an important variety in central and eastern Ontario.

Breeding is in progress at Harrow, Ontario.

958.

575:633(71.24)

**Annual Report of the President of the University of Saskatchewan,
Saskatoon, academic year 1945-1946 (1946): Pp. 171.**

Wheat

During the past ten years, breeding has been carried out to develop an improved variety of the Thatcher type. Promising new varieties have been produced which retain their seed colour better than Thatcher when exposed to weathering and show stem rust resistance; they also possess good milling and baking qualities, strong straw and other desirable characters.

Smooth awned, strong strawed lines of *T. durum* wheat have been secured; these are to be used as parents in further crossing to attain higher yielding ability. A large number of promising lines from crosses involving the rust resistant bread wheats from Kenya are now ready for yield tests.

Oats

Cytological investigation of a giant type with a chromosome number greater than the normal number of $2n = 42$ is in progress.

The improvement of hull-less oat is reported.

Two new varieties from crosses of Victory with disease resistant American varieties of double hybrid origin exhibit particular promise.

Rye

Lines which may be superior to the standard Dakold variety are under test.

Barley

A case of striped variegation has been found to involve maternal inheritance of plastids and a recessive gene inducing plastid mutation (cf. *Plant Breeding Abstracts*, Vol. XVII, Abst. 461).

Two new varieties with satisfactory agronomic characters and good quality have been produced. The work aiming at the replacement of Warrior with a rust resistant hooded barley is progressing favourably.

Forage crops

Agropyron spp. and hybrids are being studied cytologically.

Elymus junceus, *E. canadensis*, *E. virginicus* var. *submuticus*, *Agropyron elongatum*, *A. glaucum* and a strain of *A. desertorum* are under test.

Breeding of crested wheat grass and brome grass has resulted in the production of plants showing promise in leafiness, height, density and vigour. An inbred strain of crested wheat grass has yielded 1.82 tons of hay per acre compared with the yield of 0.75 tons of the standard varieties.

Sweet clover breeding has as its main objective a variety whose seed will give a high rate of germination and will not require scarification, the control and eradication of the crop thus being facilitated.

Lucerne breeding for improved seed yield, and resistance to crown rot and black stem is being conducted.

Potato

Breeding is reported. A specific gravity test of the tubers is being used as a basis of selection.

Flax

Lines from the hybrids C.I.977 and 976 x Redwing are under preliminary test for yield; the lines are fairly early maturing, and resistant to wilt and rust.

Oil crops

Strains of annual rape have shown wide variation in yielding capacity.

Sunflower breeding was continued. A high-yielding single cross hybrid was named Advance.

Fruits

Selection of apple, plum and cherry seedlings is reported.

Strawberry seedlings were also selected.

*GENETICS 575.1

959. DARLINGTON, C. D. 575.1(47)

A revolution in Soviet science.

Discovery 1947: 8: 40-43.

A brief review is given of the history of genetics in the U.S.S.R. from the foundation of the Lenin Academy of Agricultural Sciences to the present day, paying particular attention to the controversy between Vavilov and the Mendelian geneticists on the one hand, and Lysenko and his school on the other. The account is based principally on Dobzhansky's translation of Lysenko's *Heredity and its Variability* (cf. *Plant Breeding Abstracts*, Vol. XV, Abst. 117) and *The New Genetics in the Soviet Union* by Hudson and Richens (cf. *Plant Breeding Abstracts*, Vol. XVI, p. 365). The author criticizes strongly the whole basis of Lysenko's system and expresses dismay at the extent to which it appears to have gained ascendancy in the Soviet Union.

960. BAKER, H. G. 575.12

Criteria of hybridity.

Nature, Lond. 1947: 159: 221-23.

A critical review is presented of the methods that have been used for studying hybridity in natural populations. After emphasizing that experimental crossing of putative parents should precede studies of natural hybridization, the author proceeds to show what types of characters can then be used for diagnosing naturally occurring hybrids.

961. BAKER, H. G. 575.12

"Criteria of hybridity".

Nature, Lond. 1947: 159: p. 546.

The importance is stressed once again of making artificial crosses before applying the index method of investigating natural populations (cf. Abst. 960).

* General studies, see also individual crops.

962. MULLER, H. J.

575.17

The gene.

Proc. Roy. Soc. 1947: 134: 1-37.

This article is a Pilgrim Trust lecture delivered in 1945, with supplementary notes; it is a general review of present conceptions as to the nature of the gene.

To begin with, the evidence and *a priori* considerations for distinguishing genetic from non-genetic living material are set out, then the reasons for holding the theory that genes are single particulate aperiodic bodies linearly disposed along the chromosomes. The author favours the definition of the gene as the minimum amount of genetic material capable of individual self-duplication, though it is admitted that there may be difficulties in applying this definition.

The factors influencing mutation rate are considered, and the random nature of mutation is emphasized.

Passing on to non-nuclear genetics, consideration is given to plastid genes, plasmagenes, the κ substance of Sonneborn (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 139 and Abst. 1153), Darlington's theory on the origin of viruses (cf. *Plant Breeding Abstracts*, Vol. XV, Abst. 17) and Altenburg's viroid hypothesis (cf. *Plant Breeding Abstracts*, Vol. XVII, Abst. 631). Generally speaking, it is thought unlikely that cytoplasmic genetical systems are of much evolutionary importance.

Regarding the problem of increase in the number of genes throughout evolutionary history, the author is inclined to maintain that every gene has had its origin from a pre-existing gene. Special attention is given to the possible mechanisms of self-duplication of genes, and synapsis. Other subjects treated include the *Pneumococcus* transformation, the way in which the genes affect the life of the cell, the position effect, and the evolutionary significance of sex in bringing about the shuffling of genes.

A final section is devoted to the sociological implications of genetics.

963.

575.22:581.5

GREGOR, J. W.

576.16

Ecotypic differentiation.

New Phytol. 1946: 45: 254-70.

A discussion is presented of the significance of ecotypic differentiation, which the author elucidates with reference to the ecotypes of *Plantago maritima* L. The connexion between patterns of ecotypic differentiation on the one hand, and breeding structure and reproductive capacity on the other is considered. Although certain characters of a population may exhibit ecocline variation, it may be convenient to recognize as ecotypes certain samples from the clinal continuum. The correlation between the characters of a population and its environment are complex, and it is possible, in view of the high gametic and seedling mortality of *P. maritima* and other species, that fortuitous establishment may be more significant than the effects of selection in accounting for the particular genetic composition of a given colony. The term topocline is applied to a cline not correlated with any known ecological gradient; the same plant character may show both ecocline and topocline variation.

***CYTOLOGY 576.3**

964.

CORNMAN, I.

576.356.5:581.04

The responses of onion and lily mitosis to coumarin and para-sorbic acid.

J. Exp. Biol. 1947: 23: 292-97.

C-mitotic effects have been induced in *Allium Cepa* and *Lilium longiflorum* by means of coumarin. P-sorbic acid merely delayed mitosis; sorbic acid caused cessation of growth but caused no mitotic abnormalities.

* General studies, see also individual crops.

965. LA COUR, L. F. and DREW, R. 581.192:578.08
Partition-chromatography and living cells.
 Nature, Lond. 1947: 159: 307-08.

A chromatographic method is described for detecting the presence of free amino-acids in biological tissues. It is hoped that this method may eventually prove of value in analysing the biochemical constitution of chromosomes.

*DISEASES AND INJURIES, BACTERIA, FUNGI 632

966. PONTECORVO, G. 632.3:577.1:575.1
 632.421:577.1:575.1
Genetic techniques in the development of microbiological assays.
 Biochem. J. 1947: 41: No. 1: xii-xiii. (Abst.).

The use of induced nutritional mutants in investigations on the bacteria and moulds is discussed with reference to the results of recent research.

967. FRIES, N. 632.421.9:575.243:578.08
Experiments with different methods of isolating physiological mutations of filamentous fungi.
 Nature, Lond. 1947: 159: p. 199.

A description is given of the methods used by the author for inducing and isolating physiological mutants of *Ophiostoma multiannulatum*. It is noted that, in comparison with *Neurospora*, *O. multiannulatum* yields fewer mutants deficient in amino-acids or growth substances, but more mutants with altered sulphur requirements or deficient in nucleotides.

968. THORNE, R. S. W. 632.422.3:575.1
Inheritance in yeast.
 J. Inst. Brew. 1947: 53: 25-36.

The general principles of Mendelian inheritance are described, and a review is given of investigations on inheritance in the yeasts, with particular reference to the work of Winge and Lindegren.

ECONOMIC PLANTS 633

969. SINGH, H. 633(54.5)
Some useful wild plants of the Delhi Province.
 Indian J. Agric. Sci. 1945: 15: 297-308.

Brief botanical notes are given on approximately 150 wild plants of the Delhi Province, under the following headings: (1) edible plants; (2) edible fruits; (3) fodder plants with particular reference to famine conditions; (4) medicinal plants; (5) ornamental plants; (6) other useful species; and (7) material of interest to plant breeders. The latter section refers to *Carthamus oxyacantha*, *Hibiscus micranthus*, *Corchorus* spp., *Crotalaria* spp., *Plantago* spp., *Nicotiana plumbaginifolia*, *Solanum incanum*, *Lolium temulentum* and *Urena lobata*.

970. JOHNSON, L. P. V. and HOLTZ, H. W. 633:581.04:576.356.5
Colchicine treatment techniques for sprouted seeds and seedlings.
 Canad. J. Res. 1946: 24: Sect. C: 303-04.

The problem of over-treatment of the root during colchicine treatment of sprouted seeds and seedlings in polyploid induction is emphasized. Techniques are described for treating sprouting seeds and spring seedlings with an aqueous colchicine solution, by means of which the stem is subjected to colchicine treatment without immersion of the root. The methods are considered to be applicable to most plant species normally produced by seed.

WHEAT 633.11

971. 633.11(94.4)
Varieties of wheat recommended for 1947 sowing.
 Agric. Gaz., N.S.W. 1946: 57: 626-27.

Wheat varieties recommended for the different areas in New South Wales are listed.

* General studies, see also individual crops.

972.

633.11:575(71.24)

New strain of Apex wheat developed at Saskatchewan "U".

Canad. Grain J. 1947: 2: No. 7: p. 12.

A brief note is given on the new strain of the rust resistant Apex wheat, Sask. 2155, which has been developed by back-crossing to Marquis. Under experimental conditions, Sask. 2155 has outyielded Apex.

973.

SEMENIUK, W.

633.11:575.127.2:576.354.4

Chromosomal stability in certain rust resistant derivatives from a *T. vulgare* x *T. Timopheevi* cross.

Sci. Agric. 1947: 27: 7-20.

Chromosomal behaviour was studied in rust resistant selections of the cross Steinwedel (*Triticum vulgare*) x *T. Timopheevi* ($2n = 28$). The two parent varieties, and Premier, Merit, Thatcher and the back-cross of Thatcher x Hope to Thatcher were examined as the controls. In the cytological investigation of hybrid lines with the spring habit, the 55 plants representing 19 lines which were examined, had approximately the chromosome number of *T. vulgare*, with the exception of one plant with 28 chromosomes. Univalents were observed in 4.8-53.8% of the cells at metaphase I in eight spring lines of the cross Steinwedel x *T. Timopheevi*. The varieties used as controls had 1.4-11.7% of cells with univalents at metaphase I.

The data on the hybrid lines with spring habit indicated highly significant correlations between the percentage of cells with univalents at metaphase I and the following: total number of cells showing chromosomal abnormalities at anaphase I, metaphase II and anaphase II; frequency of micronuclei at interphase and in the spore quartets; and percentage of aborted pollen. All the correlations were sufficiently high to be valuable in selection as criteria of chromosomal stability.

The progeny of six plants with spring habit were also studied cytologically; differences in chromosomal stability were found to be inherited.

Lines with the winter habit appeared to have less chromosomal stability on the average than those with the spring habit.

F_1 hybrids obtained by crossing a Steinwedel x *T. Timopheevi* line possessing the winter habit with Premier and Merit showed a much greater frequency of chromosomal abnormalities than either parent.

Selection of lines combining a high degree of chromosomal stability, stem and leaf rust resistance and the characteristics of *T. vulgare* was achieved.

It is suggested that the percentage of aborted pollen may be useful to the plant breeder in the elimination of highly unstable lines; and also that the frequency of quartets or microspores with micronuclei, the frequency of univalents at metaphase I, the frequency of micronuclei at interphase and the chromosomal abnormalities at metaphase II may be useful as a subsequent check of selected lines.

974.

633.11:575.127.5:633.289(71)

Prospect for creation of perennial wheat not bright says Saskatchewan Professor.

Canad. Grain J. 1947: 2: No. 6: p. 8.

A very brief report is given of an address by J. B. Harrington to the Saskatchewan Agricultural Graduates' Association. Canadian plant breeders, the speaker pointed out, have only had limited success in the development of perennial wheat, and particular mention is made of unsatisfactory yield in seasons of insufficient rainfall, and the difficulties of weed control. Brief reference to current breeding work on winter wheat is also included.

975.

ARMSTRONG, J. M. and

STEVENSON, T. M.

633.11:575.127.5:633.289:581.6:576.356(71)

The effects of continuous line selection in *Triticum-Agropyron* hybrids.

Emp. J. Exp. Agric. 1947: 15: 51-64.

A report is presented on the success of line selection work with *Triticum-Agropyron* hybrids, involving the wheat varieties Kharkov, Minturki, Turgidum, C.A.N. 1835, Lutescens 062 and Vernal, and the grass species *A. elongatum*, *A. glaucum* and *A. cristatum*. Since

many of the hybrids or the amphidiploids derived from them are at least partially fertile, continuous selection is possible.

The selections so far obtained do not compare with wheat in milling or baking quality, but the grain of many has a high nutritive value as forage. Lines selected for increased grain size have shown good seedling emergence.

Perennial habit appears to be determined by a multiple series of dominant genes, and can be fixed in advanced generations.

Both morphological and cytological variability has decreased in advanced generations. Meiosis in the later generations also tends to be more regular, and possible reasons for this are discussed. Chromosome numbers approximately intermediate between those of the original parents have tended to persist.

It has proved possible to correlate the manifestation of wheat-like characters with the proportion of wheat chromosomes.

976. CHINOY, J. J. 633.11-1.557(54)
Correlation between yield of wheat and temperature during ripening of grain.

Nature, Lond. 1947: 159: 442-44.

A significant negative correlation has been established between the yield and 1000 grain weight of wheat varieties grown in India on the one hand, and the length of the vegetation period on the other.

977. GORTER, G. J. M. A. 633.11-2.8-1.521.6(68.2)
Wheat stunt—a new cereal disease.
 Fmg S. Afr. 1947: 22: 29-32.

A virus disease of wheat whose characteristic symptom is the occurrence of chlorotic streaks along the leaf veins is reported in the Transvaal; the condition has long been known to farmers in the eastern Transvaal under the name of "kroeskoring". Rehown, Reward, Marquis and Regent are the only varieties which appear to be immune.

OATS 633.13

978. 633.13:575(71)
New oats variety Beacon particularly adaptable to fertile soils of Ontario.

Canad. Grain J. 1947: 2: No. 7: p. 14.

A brief discussion is given of the new oat varieties introduced in Canada during the last decade. It is mentioned that seed of a new variety known as Beacon is to be available commercially in the spring of 1948.

979. HOLMAN, W. I. M. and 633.13:577.16:581.6(42)
 GODDEN, W.
The aneurin (vitamin B₁) content of oats. I. The influence of variety and locality. II. Possible losses in milling.
 J. Agric. Sci. 1947: 37: 51-57.

No statistically significant intervarietal differences could be discovered between the aneurin contents of a series of commonly grown British oat varieties. The effect of locality on aneurin content was also negligible. A correlation of $r = +0.42$ was found between protein content and aneurin content.

980. 633.13-2.7-1.521.6:575.1(42)
 CUNLIFFE, N. and 633.15-2.7-1.521.6
 HODGES, D. J. 633.13-2.8-1.521.6:575.1(42)
Studies on *Oscinella frit* Linn. Notes on the resistance of cereals to infestation.

Ann. Appl. Biol. 1946: 33: 339-60.

No correlation was observed between the resistance of oat varieties to frit fly and their carbohydrate or silica content. It was shown that field resistance is correlated with infrequent oviposition, not with unpalatability, since by artificially increasing the number of eggs on a resistant variety, it behaved as a susceptible type.

The basis of resistance to oviposition is uncertain, and experiments on the reaction of the flies to visible and ultra-violet radiation were largely inconclusive. It was established however that resistance is heritable, and data on the resistance of a series of oat varieties are presented. Summer, Spet and Hede are classed as resistant, and Sandford, Richland Iowa 411 and Eagle as moderately resistant. Notes are also given on the varietal resistance of maize.

The degree of stem infestation in oats may not correspond with the degree of grain infestation. Data are also given on the latter and on the percentage of blind spikelets for several varieties. Susceptibility to blind spikelet formation is heritable and may segregate transgressively.

BARLEY 633.16

981. 633.16:575(71.27)
New feed barley at Brandon Experimental Farm shows promise: christened Vantage.
 Canad. Grain J. 1947: 2: No. 6: p. 8.
 The new Vantage variety of barley has shown promise in tests conducted at the Dominion Experimental Farm, Brandon, Manitoba. It was developed by crossing a strong strawed, stem rust resistant selection from a cross between Newal and Peatland, with Plush.

982. 633.16:581.46:575.11
 FRIESEN, H. A.
Awn-barbing in barley.
 Canad. J. Res. 1946: 24: Sect. C: 292-97.
 The following types of awn barbing have been classified in six barley varieties studied: rough, intermediate, smooth, and very smooth. The varieties bred true for the type of awn barbing they possessed.
 A number of crosses were made between varieties with intermediate and smooth awns, and between varieties with intermediate and very smooth awns.
 The results indicate that two genes condition smoothness of awns in the varieties investigated. One factor, designated *S*, produces intermediate smoothness of awn and is epistatic to *R*, the dominant gene for roughness of awn; the factor *s*, alleomorphic to *S*, produces the smooth awned condition when homozygous. These results are in agreement with those of other investigators. Another factor, termed *S*₁, is hypostatic to *S*, and its alleomorph *s*₁ results in the very smooth awned condition when homozygous. The following genotypes are suggested for the different types of awns: rough awns, *RRSSS*₁*S*₁; intermediate smooth awns, *rrSSS*₁*S*₁; smooth awns, *rrssS*₁*S*₁; and very smooth awns, *rrsss*₁*s*₁.

983. 633.16:581.6(42)
 BROWN, B. M. and
 WILMOT, J.
Malting and brewing trials with three types of English barleys.
 J. Inst. Brew. 1947: 53: 10-14.
 A report is given of malting and brewing trials of BN 150, a new Archer-Spratt selection, and BN 151, an early ripening Spratt-Archer selection, with the standard stock of Spratt-Archer barley as control. The first trial of these barleys was carried out on the 1944 crop (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 1058); a further trial to complete the investigations on the malting and brewing qualities of these barleys is to be made on the 1946 crop.

984. 633.16:581.6:575(71)
 HARRISON, T. J.
Barley and linseed flax committee pays tribute to Montcalm founder.
 Canad. Grain J. 1947: 2: No. 7: p. 17.

An account is given of the work carried out by E. A. Lods in breeding the Montcalm malting barley.

RICE 633.18

985. 633.18:581.162.5:575.113.4
 HSU KUAN-JEN.
On sterility resulting from crossing different types of rice.
 Indian J. Genet. Pl. Breed. 1945: 5: 51-57.

The genetics of sterility has been investigated in the two crosses Nanking Quality x Tangyangken and Shensi Scented x Acupangna; in each case the first parent belongs to type

indica and the second to type *japonica* of *Oryza sativa*. The F_1 hybrids of these two crosses proved highly sterile, while in later generations, segregation for sterility was observed. It is suggested that, in each case, one parent carries four duplicate genes designated *A*, and the other a single factor pair *B*. The mode of inheritance is then explained by assuming that gametes of constitution *AAB*, *AaB* or *aab* are abortive.

986. SUKHATME, P. V. 633.18-1.557:519.271.3(54.8)

Random sampling for estimating rice yield in Madras Province.

Indian J. Agric. Sci. 1945: 15: 308-18.

An account is given of the field and statistical methods used in making an experimental survey of the rice yield in the Madras Province.

FORAGE GRASSES 633.2

987. CHIPPINDALL, L. K. A. 633.2:582:001.4(68)

The common names of grasses in South Africa.

Bull. Dep. Agric. S. Afr. 1946 (1947): No. 265: Pp. 91.

Vernacular and botanical names of introduced and indigenous grasses cultivated in South Africa are listed.

ROOTS AND TUBERS 633.4

988. PLANK, J. E. VAN DER 633.491:581.143.056

Some climatic factors determining high yields of potatoes.

Part II. The potato at low latitudes and high altitudes.

Emp. J. Exp. Agric. 1947: 15: 1-8.

Continuing his paper on the environmental factors affecting yield in the potato (cf. *Plant Breeding Abstracts*, Vol. XVII, Abst. 473), the author suggests that the low tuber yields often obtained in low latitudes are largely attributable to poor seed, unsuitable varieties and primitive husbandry. In contrast to the view often expressed that the modern potato is essentially a long-day plant, it is suggested that maximum yields should be obtainable from varieties able to utilize an extended season of short days. Emphasis is laid on the importance of physiological studies in relation to theories of plant origins.

989. GLOVER, J. 633.491-1.557:581.143.26.035.1(67.8)

Environment and the growth of the potato (*Solanum tuberosum*) in tropical East Africa.

Emp. J. Exp. Agric. 1947: 15: 9-26.

Evidence is provided to show that the potato variety Kerr's Pink will give satisfactory yields in Tanganyika provided that cultural conditions are adequate. Short photoperiod and high temperatures seemed to cause no depression in yield.

990. ELLENBY, C. 633.491-2.6-1.521.6

The influence of potato variety on the cyst of the potato-root eelworm, *Heterodera rostochiensis* Wollenweber.

Ann. Appl. Biol. 1946: 33: 433-46.

Eelworm cysts on the roots of the four potato varieties, Doon Star, Arran Banner, Redskin and Kerr's Pink, were examined for their hatching response to root excretions from each of these four varieties. There were significant differences in the behaviour of the various combinations, but no correlation between the response of cysts to root excretions from the host variety.

Cyst emergence in Doon Star was markedly later than in the other varieties. The cysts in this variety were found to be smaller, the number of eggs per unit volume of cyst to be lower, and the proportion of larvae emerging to the number of eggs also to be lower than in the other varieties.

These results are discussed in the light of Gemmell's theory that varietal differences in the reaction of potato varieties to eelworm may be attributed to differences in resistance (cf. *Plant Breeding Abstracts*, Vol. XIII, Abst. 1057). Evidence for this assumption is not regarded as conclusive.

991. STEPHENS, S. G. 633.51:575(73)
Some recent trends in cotton research in the United States.
 Emp. Cott. Gr. Rev. 1947: 24: 28-35.

An account is given of the breeding and genetical work on cotton in progress at the experimental stations in Texas, Mississippi and North Carolina.

992. RAMIAH, K. 633.51:575.061.6
 633.18:575.061.6
Anthocyanin genetics of cotton and rice.

Indian J. Genet. Pl. Breed. 1945: 5: 1-14.

A review is presented of present knowledge on the genetics of anthocyanin pigmentation in cotton and rice. Tables are included of the phenotypic manifestations of the R_2 allelomorphs in cotton, and of the complex pigmentation patterns occurring in certain rice groups. Among the subjects discussed are the rival theories of pleiotropy and closely linked allelomorphism put forward for explaining the multiple effects of the various pigmentation series, also the various causes contributing to red leaf blight in cotton.

993. IYENGAR, N. K. 633.51:576.356:575.127.2
Cytological investigations on some of the interspecific hybrids of (American x Asiatic) x American cottons and their progenies.
 Indian J. Genet. Pl. Breed. 1945: 5: 32-45.

Progenies have been raised by back-crossing F_1 hybrids between American and Asiatic cottons to American cottons. The chromosome numbers of the back-cross progenies varied from $2n = 50$ to $2n = 80$, with modes at 52 and 65.

Meiosis was fairly regular in the 52-chromosome hybrids, and these were in general highly fertile. Pairing was also good in the 50, 51, 53 and 55 chromosome hybrids, and the 50 and 51 chromosome plants tended to give rise to offspring with 52 chromosomes.

Chromosome numbers from 53 to 67 were found in the progenies of the 65-chromosome back-cross hybrids, and these plants varied considerably, both in meiotic behaviour and in gross morphology.

994. CHOUDHURY, J. K. 633.523-2.1-1.521.6
Growth and yield of jute plants in relation to watering.
 Sci. and Cult. 1946: 11: p. 445.

No significant difference in tolerance to water-logging could be demonstrated between *Corchorus capsularis* and *C. olitorius*.

SUGAR PLANTS 633.6

995. 633.61:575(94.3)
 633.61-2-1.521.6(94.3)

Forty-sixth Annual Report of the Director of the Bureau of Sugar Experiment Stations, Queensland 1946: Pp. 46.

Sugar cane varietal trials conducted at the different experiment stations are reported.

The Report of the Committee on Seedling Propagation describes the cross-pollination work carried out in 1946, seedling trials, and the varietal composition of the 1945 commercial crop.

Trials of varietal disease resistance to gumming disease (*Bacterium vasculorum*), downy mildew (*Sclerospora Sacchari*), Fiji disease, leaf scald (*B. albilineans*) and chlorotic streak were conducted.

996. NICHOLS, R. F. W. 633.682-2.8-1.521.6:575.12(67.8)
Breeding cassava for virus resistance.
 E. Afr. Agric. J. 1947: 12: 184-94.

An account is given of work carried out at the East African Research Institute, Amani, Tanganyika, on the breeding of cassava resistant to the mosaic and brown streak viruses. Breeding has consisted of intervarietal hybridization within *Manihot utilissima* and interspecific hybridization. The methods employed in seed production, propagation, the field trials of virus resistance, the classification of field resistance, and tests for immunity by grafting, are described in detail.

Interspecific hybridization of *M. utilissima* with "tree" cassava, *M. Glaziovii*, *M. dichotoma*

and *M. saxicola* is reported. Back-crossing to cassava was successful; the third back-cross generation has been secured. A discussion is given of the fertility, morphology, disease resistance and quality of these hybrids.

Wide differences in the virus resistance of the clones have been shown in the field trials; highly resistant forms of *M. utilissima* and interspecific hybrids have been produced. The grafting experiments, however, indicate that it is unlikely that complete immunity will be obtainable, except in the case of hybrids between cassava and *M. dichotoma*; but it is emphasized that seedlings of this origin are only immune to particular strains of virus. It is not yet known whether this immunity will be retained when the normal tuberous root system is restored after continued back-crossing.

STIMULANTS 633.7

997. 633.72:575.42(54.8)

Twentieth Annual Report of the Board of the Tea Research Institute of Ceylon for 1945: Bull. No. 27: Pp. 52.

A large number of clones derived from selected mother tea bushes have been planted for further large scale trials. A successful method of propagation has been developed in which use is made of single internode cuttings. Information is given on the yields of the 1937/38, 1939 and 1941 series of clones.

998. HOWES, F. N. 633.74-1.524

The early introduction of cocoa to West Africa.

Trop. Agriculture, Trin. 1946: 23: p. 172.

Information obtained from records is given on the early introduction of cacao in West Africa.

It is probable that the present day cacao of West Africa, apart from the recent introductions by experiment stations, is of dual origin, that of Nigeria and the Gold Coast having originated from Brazil, and that of Sierra Leone from the West Indies.

999. BAKER, R. E. D. and CROWDY, S. H. 633.74-2.472.3-1.521.6(72.98)

Studies in the witches' broom disease of cacao caused by *Marasmius perniciosus* Stahel. Part II. Field studies and control methods.

Mem. Imp. Coll. Trop. Agric. Trin. 1944: Pp. 28.

Differences in resistance to witches' broom disease between cocoa selections studied in Trinidad are reported.

1000. 633.74-2.7-1.521.6(66)

633.74-2.8:576.16:631.521.6(66)

Tenth Quarterly Report of the West African Cacao Research Institute, Tafo, October-December, 1946: Pp. 23. (Mimeographed).

An investigation of the degree of preference of capsids for a clone of S.C.1, a selection which has shown apparent resistance at Asuansi, and an ordinary control, Amelonado T.F.7, has been begun at Tafo.

The testing and propagation of clones resistant to strain A of the swollen-shoot virus has continued. It has been found that most "resistant" clones are infected with a mild form of strain A, and are thus protected against the virulent form. Some clones appear to be capable of attenuating the virulent strain; the nature of this capacity is being investigated. Certain selections continue to yield well. In the first progeny trial, which consists of seedlings now six years old, marked differences between the progenies have been observed.

OIL PLANTS 633.85

1001. 633.85:575.42(68)

HILL, A. G. 634.58:575.42(68)

Oil plants in East Africa. (1) Groundnuts, (2) sesame and (3) sun-flowers.

E. Afr. Agric. J. 1947: 12: 140-52.

An account is given of the cultivation and types and varieties of groundnut, sesame and

sunflowers in East Africa, with reference to the improvement of these crops by selection.

1002.

633.853.49:575.42(71.24)

Three new strains of rape developed by H. G. Neufeld.

Canad. Grain J. 1947: 2: No. 6: p. 16.

The selection of three new strains of Argentine rape is reported. The new strains give higher yields, and have a higher oil content and lower iodine value than the parent variety.

1003. KUMAR, L. S. S. and

RANGA RAO, D. S.

633.853.74:581.162.5:575.11

Inheritance of sterility in *Sesamum orientale* L.

Indian J. Genet. Pl. Breed. 1945: 5: 58-59.

A recessive gene s_c determining sterility has been discovered in the sesame type Bijapur White.

RUBBER PLANTS 633.91

1004.

633.912:575(54.8)

Report of the work of the Rubber Research Board in 1945.

Rubber Res. Scheme, Ceylon November 1946: Pp. 44.

Philpott, M. W.

Chemical department. (pp. 4-13).

Investigations on variability in quality in *Hevea* rubber were carried out with a view to examining the possibility of improving quality by breeding. The criterion used for the preliminary classification of the material studied was the hardness index, measured by the parallel-plate plastimeter.

Trees about 38 years old in a mixed seedling stand showed wide variation in hardness values. The study of seedling trees of controlled parentage indicated that a family of individual trees derived from a single seed parent, or of a legitimate family whose members had a common parentage, may be as variable in hardness value as any random group of trees with a mixed heredity.

From a study of the hardness of seedlings and bud grafts, it appeared that hardness and hence any property associated with it, is genetically controlled.

No evidence was obtained of significant intra-clonal variation in hardness index.

Hard rubber and the secretion of highly concentrated latex were found to be correlated and vice versa. The data provided no evidence of association between hardness and high yield.

Investigations on the relationship between plasticity and height of tapping and on seasonal and other fluctuations in the properties of the latex are also reported.

Sharp, C. C. T.,

De Silva, C. A. and

Ford, C. E. *Botanical and Mycological Department. (pp. 14-18).*

Studies of clones and seedling families were continued. Six clones established from Prang Besar seedlings at Nivitigalakele, which were selected in 1944, have been planted in a large scale clonal trial at Hedigalla, clone T.J.1 forming the control.

Over 30,000 pollinations were made, 15% of which were successful. Over 5000 seedlings have been obtained from the seeds, representing about 60 families. These families include some of the older A.V.R.O.S. clones, clones T.J.1, P.B.23 and B.R.2, clones belonging to new series of Prang Besar material, R.R.M. '500 series' clones, clones established from high yielding Prang Besar seedlings, and imported clones such as AV.255, 352, KD.1 and P.R.107.

FRUITS AND NUTS 634

1005. HILTON, R. J.

634.11-2.3-1.521.6(71.23)

Fire blight in Alberta. A serious scourge of apple trees.

Pr. Bull. Univ. Alberta 1947: 32: 2-3.

A list is included of apple and crab-apple varieties grown at the University of Alberta which have shown resistance or susceptibility to fire blight.

1006. JOHNSON, L. P. V. and
HEIMBURGER, C. 634.97:575.127.2(71)
Preliminary report on interspecific hybridization in forest trees.
Canad. J. Res. 1946: 24: Sect. C: 308-12.

A summary is given of the work on the interspecific hybridization of forest trees carried out during the period 1938-1945, chiefly at the Petawawa Forest Experiment Station, Chalk River, and at the Dominion Arboretum, Ottawa. The genera studied include *Populus*, *Picea*, *Pinus*, *Betula*, *Fraxinus*, *Ulmus* and *Tilia*.

1007. JOHNSON, L. P. V. and
BRADLEY, E. C. 634.97:581.162.32:578.08
Hybridization technique for forest trees.
Canad. J. Res. 1946: 24: Sect. C: 305-07.

A hybridization technique is described, pine being chosen as an example. A combination of a glassine inner bag and a kraft outer bag was found to provide the most satisfactory means of protecting the female flowers from chance pollination. In carrying out pollination, the kraft bag was removed and the glassine bag punctured with the point of a specially designed "pollen gun". The pollen was then introduced into the bag by squeezing the bulb of the gun; finally the puncture was sealed by an adhesive patch and the kraft bag replaced. The pollen gun is attached to a pollen container in the form of a small Erlenmeyer flask, which can be stored over calcium chloride.

1008. JOHNSON, L. P. V. 634.972.3:575.127.2:581.4:575.11
A note on inheritance in F_1 and F_2 hybrids of *Populus alba* L. x *P. grandidentata* Michx.
Canad. J. Res. 1946: 24: Sect. C: 313-17.

The mode of inheritance of several leaf characters was investigated in the cross *P. alba* L. x *P. grandidentata* Michx. The characteristics of leaf shape, margin, apex and base were found to be conditioned by multiple factors. The non-lobed type of leaf tended to be dominant. Pubescence of the lower surface of the leaf appeared to be determined by four pairs of cumulative factors.

The colour of the upper leaf surface showed an F_2 segregation into dark green, light green and medium green in the simple Mendelian ratio of 1:2:1. The grooved or non-grooved character of the midrib appeared to be due to the expression of three genes, according to the F_2 data. It is suggested that three or more dominant alleles produce a non-grooved midrib, two dominant alleles give a slightly grooved midrib, while one dominant allele results in a grooved midrib.

Tree height showed marked heterosis in the F_1 , but the F_2 segregates with relatively low vigour preponderated.

The good rooting capacity of *P. alba* cuttings was transmitted to the F_1 hybrids as a dominant character. The author suggests that *P. alba* is homozygous for one or more dominant alleles for high rooting capacity which are not present in *P. grandidentata*.

1009. SAMPATH, S. 634.976.26:576.312.35
Chromosome numbers in *Sesbania* spp.
Curr. Sci. 1947: 16: 30-31.

From investigations of the chromosome numbers in varieties of *S. aculeata* and *S. grandiflora*, the author concludes that both diploid ($2n = 12$) and polyploid ($2n = 24$) varieties are included in the former species, while the chromosome number of the latter species ($2n = 24$) is probably invariable.

VEGETABLES 635

1010. CONNOLLY, F.,
HILTZ, M. C. and
ROBINSON, A. D. 635:577.16(71)
Thiamin in Manitoba vegetables.
Canad. J. Res. 1947: 25: 43-53.

The thiamin content of varieties of asparagus, bean, beet, Brussels sprouts, cabbage, carrot, cauliflower, chard, cucumber, kale, lettuce, maize, onion, parsley, parsnip, pea, pepper,

pumpkin, potato, radish, squash, tomato and turnip, grown in various localities in Manitoba, has been determined, both in the fresh and stored condition, and before and after cooking.

1011. RAMANUJAM, S. and
SINGH, H.

635.657:581.45:575.11

Narrow leaf—another leaf mutation in gram (*Cicer arietinum* L.).

Indian J. Genet. Pl. Breed. 1945: 5: 46-50.

A new gene *nlv* is described for gram; it brings about narrow leaves and aberrant female-sterile flowers. Crossing data suggest the following genetic constitutions for the various leaf variants so far described for gram: normal leaf, *Slv Slv Tlv Tlv Nlv Nlv*; simple leaf, *slv slv Tlv Tlv Nlv Nlv*; tiny leaf, *Slv Slv tlv tlv Nlv Nlv*; narrow leaf, *Slv Slv Tlv Tlv nlv nlv*; and narrow simple leaf, *slv slv Tlv Tlv nlv nlv*.

1012. KADAM, B. S.,
KULKARNI, R. M. and
PATEL, S. M.

635.659:581.162.32(54)

Natural crossing in *Cajanus cajan* (L.) Millsp. in the Bombay-Deccan.

Indian J. Genet. Pl. Breed. 1945: 5: 60-62.

Data are given on the extent of natural crossing in *C. Cajan*. Under conditions at the Cereal Breeding Station, Niphad, 15% cross-pollination occurred on the average.

Part II. Foreign

PERSONALITIES 007

1013. STURTEVANT, A. H. 519.24
Thomas Hunt Morgan.
 Genetics 1947 : 32 : 1-2.

An account is given of the genetical work and academic career of the late T. H. Morgan.

*STATISTICS 519

1014. BAKER, G. A. 519.24
Distribution of the ratio of sample range to sample standard deviation for normal and combinations of normal distributions.
 Ann. Math. Statist. 1946 : 17 : 366-69.

The distribution of the ratio of sample range to the standard deviation of the population sampled has been studied for a normal population, for a symmetrical bimodal population, and for a skewed bimodal population.

1015. MOLINA, E. C. 519.24
Some fundamental curves for the solution of sampling problems.
 Ann. Math. Statist. 1946 : 17 : 325-35.

An application of the incomplete Beta function to situations where collateral information has to be utilized is presented, and a series of sampling curves are given based on $w(x) = Kx^r(1-x)^s$, a function expressing the significance of the collateral information.

1016. WALSH, J. E. 519.24
On the power function of the sign test for slippage of means.
 Ann. Math. Statist. 1946 : 17 : 358-62.

A comparison has been made of the relative efficiencies of the sign test and "Student's" t -test for slippage of means.

1017. WAUGH, F. V. 519.24
The computation of partial correlation coefficients.
 J. Amer. Statist. Ass. 1946 : 41 : 543-46.

Partial correlation coefficients may be calculated from the formula

$$r_{1k} = \frac{b_{1k}}{\sqrt{b_{1k}^2 + N'S^2b_{1k}}}, \text{ where } r_{1k} \text{ is the partial correlation, } b_{1k} \text{ the partial regression,}$$

Sb_{1k} its standard error and N' the number of degrees of freedom.

1018. WILKS, S. S. 519.24
Sample criteria for testing equality of means, equality of variances and equality of covariances in a normal multivariate distribution.
 Ann. Math. Statist. 1946 : 17 : 257-81.

A method is elaborated for ascertaining whether there is equality between the means, between the variances, and between the covariances of a normal multivariate population.

1019. WILLCOX, O. W. 519.24
How to make a standard yield diagram.
 J. Amer. Soc. Agron. 1947 : 39 : 74-77.

Instructions are given for making a standard yield diagram. The diagram does not necessitate computations by the Mitscherlich-Baule yield equation, and is valuable in the interpretation of fertilizer tests, varietal comparisons, and other agronomic investigations.

* General studies, see also individual crops.

1020. DIXON, W. J. and MOOD, A. M. 519.24:631.421
The statistical sign test.
 J. Amer. Statist. Ass. 1946 : 41 : 557-66.

The usefulness of the sign test is discussed with reference to the yield of two hybrid maize lines in seven different experiments. A table is given of the critical values of r , the number of times the less frequent sign appears, for 1, 5, 10 and 25% significance levels.

1021. NISSEN, Ø. 519.24:631.421
 Feilberegning på forsøk med systematisk parsellfordeling. (**The calculation of error in experiments with a systematic distribution of plots**).

Nord. JordbrForskn. 1942 : No. 7 : 357-58.

In this critical note, it is pointed out (1) that the method under discussion (cf. *Plant Breeding Abstracts*, Vol. XIV, Abst. 98) should be called after Knut Vik, its originator, and not after Dorph-Petersen; and (2) that a statistical slip was made by Dorph-Petersen in explaining Vik's procedure.

1022. BROUWER, E. 519.241.1
 Over correlaties van zeer hoogen graad en haar biologische beteekenis.
 (**On high correlations and their biological significance**).
 Landbouwk. Tijdschr. 1945 : 56 : 504-07.

Illustrating his argument by statistical calculations relating to the composition of butter fat, the writer shows that the very high correlations occasionally obtained in studies of biological data are not necessarily the result of biological laws and may be due to extraneous circumstances.

PHYSICS 53

1023. SMITH, F. 537.61-15:581.143
 Orienterende undersøkelser over innflydelsen av infra-rød stråling på plantene. I. (**Preliminary researches on the effects of infra-red radiation on plants. I**).
 Meld. Norg. LandbrHøgsk. 1944 : 24 : 69-144.

This paper contains a long critical discussion of the fundamental principles underlying experimentation on the effect of infra-red radiation on plants, and of research and conclusions drawn by other workers in this field.

The author's own experiments, which are recorded in detail, showed that infra-red irradiation with wave-lengths of 1.2μ and more promotes the formation of flower stems in the lettuce and radish and checks the formation of heads and tubers. It seems possible that the infra-red region in question favours the production of organic matter, a conclusion which is shown not to be in contradiction to the results of earlier investigators, some of whom, however, are thought to have drawn wrong conclusions from their work.

*BREEDING 575

1024. VILMORIN, R. DE 575(44)
 La génétique et son rôle en agriculture. (**Genetics and its role in agriculture**).
 C.R. Acad. Agric. Fr. 1946 : 32 : 640-45.

An address to the French Academy of Agriculture is reported in which the author reviews the progress made in recent years in the application of genetical principles to plant breeding. Hybridization, induced mutation and chromosomal aberrations, polyploidy and heterosis receive attention.

Of special interest is the speaker's allusion to his own work at Verrières, where mutations have been obtained in Fylgia wheat through neutron bombardment, and interesting results have been obtained with artificially induced autotetraploid strains of cabbage,

* General studies, see also individual crops.

radish and other plants. It is regretted that many lines of breeding work have not yet received attention in France.

Comments on this paper were made by Demolon, Chevalier, Boeuf and Vayssi re.

1025. DUBININ, N. P. 575(47)

Work of Soviet biologists: theoretical genetics.

Science 1947 : 105 : 109-12.

A brief conspectus is presented of the contributions of Russian geneticists to modern genetical theory. Geneticists who have worked on population genetics and the mode of operation of natural selection include Chetverykov, Romashev, Gershenson, Berg, Sokolov, Tinyakov, Olenov, Muretov, Dubinin, Sukachev, Pisarev and Sapegin. The origin of cultivated plants and phytogeographical researches have been studied by Vavilov and Lepin. Polyploidy has been investigated by Gerasimov, Karpechenko, Sakharov, Frolova, Mansurova, M. S. Navashin and Zhebrak, and wide crossing by Tsitsin (Cicin), Pisarev and Blakhsheyev.

Much work has been done on the nature of the gene and the structure of the chromosomes; investigators not already mentioned who have worked in this field include Koltsov, Belozersky, Prokofieva, Peshkov, S. G. Navashin, Levitsky, Delone (Delaunay), Sveshnikova, Kakhidze, Elengorn, Petrov, Breslavets, Pashkovsky, Gerasimova, Sidorov, Sakharov, Rapoport, Belgovsky, Khvostova (Hvostova), Ardashnikov, Shapiro, Arsenyeva and Solodovnikov.

An interesting school of thought has developed under the aegis of Schmalhausen, working on the relationship between evolution and genetics and on the evolutionary significance of adaptive modification. This school includes Kamshilov, Kirpichnikov, Lukin and Gause.

1026. LANGHAM, D. G. 575:578.08

Three useful gadgets for plant breeders.

J. Hered. 1947 : 38 : 29-32.

Descriptions are given of the author's type of tag and stake for marking varieties in the field, of a form of tag in which string is replaced by fine copper wire which can be twisted around the stalk to be marked, and of a method of arranging seeds for exhibition purposes.

1027. 575:633(43.66)

REITERER, M. 633-1.531.12(43.66)

Zur heurigen Saatgutversorgung. (This year's seed supply).

K rnter Bauer 1946 : 96 : 233-34.

Domestic varieties from abroad, which are no longer obtainable, are to be replaced in Carinthia by breeding new forms and by the use of improved land varieties in breeding operations, also by maintenance breeding so that the existing improved land varieties may be kept at their relatively high level of yield.

1028. 575:633(47)

[Short report for 1944 on scientific research at the Institute for Grain Husbandry (awarded the Workers' Red Banner) of the South East Region of the U.S.S.R.]

Bjulletenj Instituta Zernovogo Hozjaistva Jugo-Vostoka S.S.S.R.

(Bull. Inst. Grain Husb. S.E. U.S.S.R.) Saratov 1944 : No. 4 : 3-28.

In addition to the cultural measures which have been adopted in the South East Region of the U.S.S.R. to combat the effects of recurrent drought at various seasons of the year, work has also been done to produce new varieties of cereals and to improve the seed of already regionally allotted varieties.

Observations have shown that wheat seed from the central parts of the ear and from the outer florets of the spikelet has a higher absolute weight and give a higher yield than seed from other parts. The effects of various treatments of the grain before sowing upon time of tillering and earing were also investigated.

Methods of cultivation are discussed in relation to seed production from grass mixtures, and in lucerne.

Variety trials during the year of 17 spring wheats, 3 autumn forms, 1 rye and 3 sunflowers included the two wheats *Lutescens* 53/12 and *Albidum* 43 already described (cf. *Plant Breeding Abstracts*, Vol. XV, Abst. 597).

Selections made in 1944 of a number of new spring wheats with higher yields and showing resistance to fungous diseases, lodging and shedding and other desirable features included Milturum 313 and 1354, and Lutescens 1281. Other selections regarded as promising are: Erythrospermum 1321; Lutescens 1154, 1278, 347, 24, 25 and 30; and Albidum 891, 210 and 440.

Families 615 and 758 of Lutescens are thought to be promising in resistance to loose smut. Various rye-wheat hybrids were also tested.

Among the winter wheats in process of being tested were Hostianum 237 which yielded 35.1 centners per ha., and Lutescens 230 which is highly resistant to cold and combines resistance to lodging with a large vitreous grain and good baking qualities.

The new hybrid wheats Erythrospermum 356 and 332 showed considerable resistance to wheat midge.

The new winter rye Volžanka 7 has surpassed Saratov 1 in yield and is now being included in the state variety trials.

An attempt to improve the quality of winter rye seed by supplementary artificial pollination has resulted in increased yields of seed ranging from 1.0 to 3.5 centners per ha., according to weather conditions at the time of flowering.

Further evidence from experiments with rye hybrids was recorded showing that large seeds give a bigger harvest than grain of ordinary size.

Among promising sunflower selections undergoing tests is Saratov 19. Saratov P10 and Mestnyi Romanovskii have exceeded Saratov 169 in yield of seed and in oil per ha. by from 16.5 to 21%.

Kremovoe 311 is a new millet with a yield of 17.18 centners per ha., it ripens five to ten days later than the variety allotted to the region, thus allowing of a more prolonged period for the millet harvest; it has been entered for further tests.

Five forms of perennial wheats (*Agropyron*-wheat hybrids) are announced as undergoing multiplication and improvement.

1029. ÅKERMAN, Å. 575:633(48.5)
Brödsädesodlingens fredsplanering och därav föranledda krav på
växtförädlingen. (**The planning of the growing of bread cereals
in peacetime and the consequent requirements in plant breeding**).
Årsb. Jordbruksforskning, Stockholm 1946 : 64-68.

Future requirements are briefly summarized with reference to the area under cereals and the improvement by breeding of grain quality from the standpoints of milling, disease resistance and winter hardiness combined with high yields.

Possibilities as regards the cultivation of oil plants, winter barley, vegetables on a field scale, and seed raising are mentioned.

1030. ÅKERMAN, Å. 575:633(48.5)
Sveriges Utsädesförenings verksamhet och framtida uppgifter. (**The
work and future tasks of the Swedish Seed Association**).
Sverig. Utsädesfören. Tidskr. 1946 : 56 : 575-81.

This speaker at the 60th anniversary of the Swedish Seed Association outlined the course of development of plant breeding in Sweden, indicating the methods used and the role of the various sub-stations and other co-operating institutes and concerns who have contributed so much to the achievements of Swedish breeders. Extensive grants from various private firms and foundations as well as official aid for building equipment and projects have played, and are playing, their part in the successful development of research in plant breeding and genetics in Sweden.

1031. ANDERSSON, G. 575:633(48.5)
Sveriges Utsädesförenings årsmöte och 60-årsfest den 12-13 juli 1946.
(**Annual Meeting and 60th Jubilee of the Swedish Seed Association, 12-13 July, 1946**).
Sverig. Utsädesfören Tidskr. 1946 : 56 : 543-72.

ÅKERMAN, Å.

Donationer till Sveriges Utsädesförening. (**Donations to the Swedish Seed Association**).

Ibid. 1946 : 56 : 573-74.

ANDERSSON, G.

Ytterligare donationer till Utsädesföreningens nya laboratoriebyggnad. (**Further donations to the new laboratory building of the Swedish Seed Association**).

Ibid. 1947 : 57 : p. 71.

In the opening address constituting the first article, the past and present development and achievements of the Association were outlined, special reference being made to the contacts and collaboration maintained with other scientific organizations, with industries and with the Swedish farming community, and also to the generous financial aid received from many sources, both official and private.

After plot demonstrations, visits were made to Balsgård, where the institute of the Association for Fruit Tree Breeding is situated; and to Ugerup, where a special type of drying shed, presented by the Tobacco Monopoly, for the tobacco plots, was shown, in addition to the work on potatoes, sweet lupins and other crops suited to sandy soils.

The second and third communications announce the total to date of 607,000 kr. received in grants from various industrial and other bodies for development and buildings in recent years. Many other contributions have been made for special purposes.

1032. FRANDSEN, H. N.

575:633(48.9)

Planteforædlingsarbejdets Opgaver og Muligheder. (**The tasks and possibilities of plant breeding**).

Tidsskr. Landøkon, 1942 : No. 10 : 553-74.

This paper sets out first the resources and organization of plant breeding in Denmark, comparison being made with countries such as Germany where the state plays a bigger role, and the scope, aid and equipment for scientific experiments are greater. Though Danish plant breeding has been very successful, many tasks still lie before it in the fields of agriculture, horticulture, forestry and industry.

Aims in plant breeding are discussed with special reference to the line of development hitherto imposed on Denmark by the predominance of private concerns in plant improvement. Increased yields have been the main objective. The methods used are described and various factors conditioning yield are mentioned, including drought and disease resistance and stiffness of straw. Quality in fodder crops has been a less important objective than yield, except for crops such as sugar and fodder beets, and malting barley and bread cereals, for the testing of which a technical laboratory has been provided by the Danish fermentation industry. In the development of tobacco, textile, oil bearing and other industrial plants, quality will be important.

Work must be intensified on the production of more hardy wheats of good baking quality; legume varieties more reliable in yield; root crops of suitable dry matter content; strains of herbage plants adapted to Danish requirements, including high yielding and reliable strains of lucerne which can be used for seed production in Denmark; red clover strains resistant to eelworm and to rot; and Danish varieties and strains of industrial plants such as flax. Details are given of the lines along which breeding has proceeded and the achievements so far attained.

The new wheats Øtofte L.3 and L.103, though hardy, need to be further improved in cold resistance, as they succumbed to the winter of 1941/42; their baking quality was slightly superior to that of Trifolium Rekord, the standard.

Little work has been done on rye, but it is likely that Danish varieties could be produced.

Barley and oats are already represented by high yielding, stiff-strawed strains of good quality which could be developed further.

Only two new varieties of peas have been produced, the Abed Marmor and the Edelgaard Kron-Aert. It should be relatively easy to produce higher yielding and more reliable varieties. At Øtofte, a new fodder pea, Øtofte Marmor, a selection from Abed Marmor, gave 170 kg. of seed per ha. more than the parent strain in a very dry season. Two new

culinary peas, Øtofte L.121/37 and L.155/37, yielded 8 and 15% respectively more than the Edelgaard Kron-Aert. Work on legumes should be extended.

Great progress has been made in root crop breeding and the dry matter content of beets has probably reached its maximum, but further efforts should increase the total dry matter and the yield of tops. The dry matter percentage in swedes can, it is believed, be still further raised and continued attention must also be given to developing resistance to pests and diseases. Two Danish strains which have done well in trials of resistance to club root are Wilhelmsburger Øtofte VIII and C, and a new selection of Wilhelmsburger Øtofte, the latter having surpassed the former in both yield and resistance. Crosses of resistant strains have been made. Resistance to other diseases is being studied with a view to eliminating the most susceptible families. Unfortunately it is not yet possible to use artificial infection.

Breeding and seed production of herbage plants are well advanced and the home requirements of seed are nearly all supplied from Danish strains. Lucerne is an exception, but high yielding and more reliable strains suitable for growing for seed in Denmark are being bred, and successful results have been obtained at Øtoftegaard and Roskildegaard with Øtofte Pt I and Øtofte Pt II, in trials with strains of Grimm from Canada and Øtofte and two Hungarian varieties. The different reactions of Øtofte Pt I and Pt II at Øtoftegaard and Roskildegaard suggests that by breeding it will be possible to produce forms less susceptible to calcium deficiency in the soil.

Lucerne seed production is another important task in which the author has already been successful in some seasons.

Birdsfoot trefoil is another plant which should be more widely grown in Denmark, and more valuable strains and seed for home use should be produced. One strain showing better seed production has been obtained, and trials at Roskildegaard have been promising in regard to improved strains for use on clover sick soil.

Some progress can also be reported on work on red clovers resistant to eelworm and *Sclerotinia Trifoliorum*, but special equipment is needed for this research. The same may be said of work on flax, though mass selection of an Øtofte strain of La Plata linseed has shown a promising increase in yield of seed. Some work has been begun on fibre flax, and some new lines, Hareskov L.5, L.6 and L.16, are being tested at Øtoftegaard.

Polyploidy and the production of new species of plants by chromosome doubling are briefly mentioned.

1033. GÖKGÖL, M.

575:633(56)

Türkiye tohum islahcılığı'nın amaçları ve bunlara ulaştıracak yollar.
(Aims of seed improvement in Turkey and ways of achieving these aims).

Çankaya Matbaası, Ankara (Genel Sayı:629) 1946 : No. 7 : Pp. 40.

After a general introduction on the advantages and aims of seed improvement, the author states that up to the present time seed improvement in Turkey has practically been confined to certain kinds of cereals. Its serious application to such crops as beans, oil plants, vegetable and fruit crops is still awaited. A review follows of the work done in some other countries. The author is of opinion that the Mediterranean coastal region of Turkey would be more favourable for the cultivation of *Cinchona Ledgeriana* than Batum and Sochi in the U.S.S.R. He thinks that the cultivation of suitable coffee varieties might be tried. Some new plants such as Sudan grass, Mentana wheat, *Taraxacum Kok-saghyz* and guayule have been introduced, and, to some extent, taken up. He does not see why tropical plants like *Musa*, pepper and dates should not be cultivated in Turkey.

As regards selection and breeding, greater attention should be paid to the possibilities of native local varieties, which should be studied in connexion with local climatic conditions. Many different types of crop plants have evolved in Turkey. Analytical studies undertaken at Yeşilköy showed that in some districts there were eight to ten and even more different kinds of wheat being grown, and each one of these was found to consist of five or six ecological types and over 20 morphological types, valuable material for the plant breeder. By selecting one or two pure lines from country barley varieties, a barley was obtained at

Yeşilköy that yielded 30–50% higher than the barleys formerly cultivated at Trakya, and up till the present, hundreds of crossings have not improved upon this barley.

Foreign varieties, e.g. Akala cotton and Mentana wheat, have been imported with success; and Turkish seed has proved its value in other countries, e.g. opium poppy seed imported into Turkestan which yielded the highest known morphine content; Fatsa hemp, which has done excellently in Italy and Jugoslavia; an oat selection No. 702 from the Istanbul region which, in Canada, has proved one of the most rust resistant varieties; and a yellow-eared hard wheat Sari Kelle [Yellow Head], which has done well in Southern Italy under the name Saragolla.

Some work has been done on interspecific crosses of wheats and of barleys. One hard wheat, 1133, grown at Yeşilköy, proved very resistant to *Tilletia*, but no soft wheats have done so.

At Yeşilköy, from ecologically different barleys, crosses were obtained that were smooth awned, and also some awnless forms.

In discussing inbreeding as a method of plant improvement, it is stated that in general plants whose flowering period is passed in very rainy regions are more fertile when self-pollinated. Some plants, such as barley and even wheat, from the northern rainy regions, have been observed to flower openly and now and then to cross-fertilize in the climate conditions of Yeşilköy. The converse has been observed by Müntzing and Eichenwald in certain fodder plants, native to sunny regions, on being grown in rainy climates.

General observations are made on X-ray mutation, vernalization, photoperiodism and acclimatization of long and short day plants.

In order to estimate the characteristics and value of the plants to the breeder, studies of the chemical composition, baking and malting quality, resistance to diseases and cold are essential, and facilities for such research must be made available at Turkish plant breeding institutes. N. I.

1034. ÅBERG, E. 575:633(73)
Forskningsstendenser inom Förenta Staternas växtodling. (**Research trends in plant breeding in the United States**).
Årsb. Jordbruksforskning, Stockholm 1946 : 97–111.

Aims, and especially methods, in American plant breeding are described in this review.

1035. 575:633(74.3)
Report of the College of Agriculture, University of Vermont,
July 1, 1944—June 30, 1945 : No. 1 : Pp. 64.

In addition to varietal trials of various crops the following investigations on forage legumes are reported:—

Forage legumes

Pollination experiments on zigzag clover have confirmed the results of previous work, indicating the need of fairly wide plant spacing, the interplanting of strains and numerous visits by bumble bees for a high seed set. Diallel crosses have demonstrated the cross-compatibility of most of the clones studied; no self-compatible strains of zigzag clover have so far been found.

Cytological studies of *Trifolium* and *Lotus* spp. are reported. An imported hay type of *L. corniculatus* was found to be diploid; a strain of *T. ambiguum* proved to be hexaploid. Colchicine treated seedlings of these legumes presented difficulties in propagation; clonal material treated with colchicine has remained unmodified. Back-crosses of fertile amphidiploids to parents with low chromosome numbers tend to be more sterile than crosses to parents with higher chromosome numbers.

1036. 575:633(74.8)
Science for the farmer.
59th Rep. Pa Agric. Exp. Sta. 1946 : Bull. No. 480 : Pp. 66.

Red clover

Red clover strains are under test.

Potato

Trials of 68 blight resistant varieties were conducted.

Tobacco

Progress has been made in breeding strains of disease resistant cigar leaf tobacco. Several seventh back-cross selections of Pennsylvania-Ambalema hybrids have shown good quality, and desirable leaf shape and colour. Among the lines combining black root rot and mosaic resistance, three were also high yielding; one of these, Pennsylvania R 5 A, also had a high leaf count and other desirable characters.

Capsicum annuum

The new Pennwonder variety, a selection of the cross California Wonder x Harris Earliest, has been released (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 1362).

Tomato

The Pennorange and Pennred stemless varieties, whose fruits are more suitable for long distance transport than those of standard varieties, are being used to improve the latter.

Sweet corn

The production of rootworm resistant inbreds has begun.

1037.

575:633(75.2)

A summary of wartime research.

57th Rep. Md Agric. Exp. Sta. 1943-1944: Pp. 40.

Maize

Hybrid production is in progress.

Barley

Wong, a new winter variety, shows promise (cf. *Plant Breeding Abstracts*, Vol. XV, Abst 534).

Potato

The late maturing, high-yielding seedling B247, has been named Potomac (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 812).

Sweet potato

Maryland Golden was found to be superior to Porto Rico for dehydration.

Capsicum annuum

Pure lines of the King of the North and World Beater pepper varieties have been secured by chemical treatment of haploid twin seedlings; twin seedlings of California Wonder are also under observation.

Peach

The new Redskin peach has been named and introduced. Redskin was produced from a cross between J. H. Hale and Elberta. It gives high yields of large, yellow-fleshed fruit of the freestone type; its dessert, canning and freezing qualities are rated high; it ripens slightly earlier than Elberta. The tree is vigorous, and its buds have shown greater winter hardiness than those of Elberta.

Strawberry

Temple, a red core resistant variety, is being introduced (cf. *Plant Breeding Abstracts*, Vol. XV, Abst. 534); other unnamed varieties are being tested for resistance.

Tomato

Selections of a cross between Brown's Special and Marglobe, back-crossed to Pan-America, show promising *Fusarium* wilt resistance, a minimum of fruit cracking, and fairly satisfactory plant and fruit type.

1038.

575:633(75.2)

Progress through research.

58th Rep. Md Agric. Exp. Sta. 1944-1945: Pp. 36.

Maize

Hybrid production is reported.

Potato

The introduction of the new Marygold potato is reported (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 833).

Capsicum annuum

The pure diploid lines derived from haploids occurring as twin seedlings in the King of the North and World Beater peppers have been used in hybridization. Haploids of California Wonder have also been secured.

Raspberry

Breeding is in progress. Seedlings showing particular promise have been obtained from the cross Sunrise x Marcy.

Strawberry

It has been demonstrated that certain selections may be resistant to red core for several years and then suddenly exhibit infection; the importance of testing resistance in several types of soil is emphasized.

1039.

575:633(76.3)

Research in agriculture.

Rep. La Agric. Exp. Sta. 1944-1945 (1945) : Pp.144.

Maize

Several hybrids developed in Louisiana are recommended.

Rice

A new race of *Cercospora* leaf spot is reported. A number of selections and hybrids of the Rexoro type have proved resistant; these are to be further tested.

The following promising hybrid selections are under final test: early selections from the cross (Colusa x Blue Rose) x (Shoemed x Fortuna); mid-season selections of (Edith x Fortuna) x AL11-1, (Edith x Fortuna) x C.I.4440, and Rexoro x Fortuna, and mid-season to late selections of Blue Rose x Rexoro back-crossed to Blue Rose, Rexoro x Purple Leaf, Blue Rose x Rexoro back-crossed to Rexoro, Blue Rose x Rexoro back-crossed twice to Rexoro, and Blue Rose x Rexoro back-crossed to Blue Rose.

Forage crops

Strains of Dallis grass have shown marked differences in seed yield and quality. The improvement of white and red clover and lespedeza is in progress.

Potato

Breeding for resistance to spindle tuber and leaf roll has received particular attention. Four seedlings have shown freedom from spindle tuber during a nine-year period, when grown in a plot adjacent to stocks known to carry this disease.

Breeding for scab and early blight resistance in the Federal Irish potato breeding programme is reported.

Sweet Potato

Breeding for disease resistance and improved vitamin and starch contents is reported.

B-196 shows promise as a sweet potato suitable for industrial use.

The work of the co-operative breeding programme has resulted in the production and release of the varieties Pelican Processor, Queen Mary and Ranger. The crosses from which these varieties were developed were made at the Louisiana Experiment Station. Pelican Processor, an industrial type, is resistant to stem rot (*Fusarium Batatas* Wr. and *F. hyperoxysporum* Wr.) under both field and greenhouse conditions; and it is being used for breeding for stem rot resistance in table types. In addition this variety is only slightly susceptible to white rust [*Albugo Ipomoeae-panduratae* (Schw.) SW.]. Queen Mary and Ranger are table types, with a high carotene content. They are very susceptible to stem and soil rots, but are moderately susceptible to less important diseases, such as white rust and leaf blight.

Cotton

Promising new strains are under test at the North Louisiana Station.

Selections of Stoneville 2B and Dixie Triumph x Deltapine are being tested for *Fusarium* wilt resistance, in co-operation with the United States Department of Agriculture. The inheritance of reaction to wilt is under investigation. Selection of Hopi crosses has resulted in the production of strains with improved boll size, some of which possess very strong fibre. Progenies of Stonewilt x Hopi and Deltapine x Hopi show the most promise.

Strains 55 x 829-47-3-7-9 and 55 x 829-33-2-9-10, derived from the cross D and P.L. x Dixie Triumph, are to be increased for release in 1947.

Sugar cane

The new variety C.P.36-105 was released (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 364). The new varieties C.P.36-13, C.P. 36-19 and C.P. 36-183 continued to show commercial promise.

Peach

A test of eight varieties for their suitability for freezing is reported.

Strawberry

A selfed seedling of Fairmore has been named Marion Bell. The new variety matures very early; the fruits, which are similar in shape and size to those of Klonmore, transport well. The variety is resistant to leaf spot and scorch.

Varieties and hybrid seedlings were tested for ascorbic acid content during the period 1942-44. Fairmore showed the highest content.

Varieties and seedlings have been tested for their suitability for quick freezing; the Konvoy variety and L27 seedlings gave the best results.

Water-melon

Breeding for *Fusarium* wilt resistance is in progress in North Louisiana.

Tomato

A selection of the hybrid Dixie x Louisiana Gulf State gave the highest yield among the varieties and selections tested; Marglobe ranked second.

Beans

Selections of hybrids between the Giant Stringless Greenpod and Kentucky Wonder pole beans were crossed with Savage. Pure lines of Savage are also being selected; approximately 50 selections are now under test for yield, quality and rust resistance.

Crosses have been made between the large seeded Fordhook variety of Lima bean and the productive Carolina Pole variety. All the plants of the F₁ exhibited the pole type of habit, and were intermediate in size of pod and seed. In general, the progenies continued to be intermediate in pod and seed size; a few, however, segregated for large seed, although they did not reach the bean size of Fordhook. There appeared to be close linkage between large seed size and late maturity and between small beans and early maturity. In order to select further for regional adaptability, the more promising large beaned selections are to be back-crossed to varieties of the Fordhook type.

Cowpea

The production of edible varieties resistant to root knot nematode and wilt is receiving attention at the North Louisiana Station.

1040.

575:633(78.1)

Thirteenth Biennial Report of the Director of the Kansas Agricultural Experiment Station, for the biennium July 1, 1944, to June 30, 1946 : Pp. 96.

Wheat

The new Wichita winter wheat has been released (cf. *Plant Breeding Abstracts*, Vol. XV, Abst. 1306).

The inheritance of properties affecting quality is under investigation.

Promising new material is under test. This includes a Hessian fly resistant selection of the cross Kawvale-Marquillo x Kawvale-Tenmarq, leaf and stem rust resistant selections with Mediterranean-Hope as one parent, and selections combining the bunt resistance of Oro-Tenmarq with the high test weight of Chiefkan.

The back-cross progenies of the crosses Marquillo-Oro x *Triticum Timopheevi* and *T. durum* var. Mindum x *Agropyron trichophorum* were studied for combined resistance to leaf and stem rust.

Breeding in hard red winter wheat for resistance to speckled leaf blotch (*Septoria Tritici*) continues.

Oats

The new Osage and Neosho varieties have been released (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 279).

The heat and cold resistance of Neosho, Osage and other oats was studied. The Kanota variety was significantly more resistant to both heat and cold than the other spring varieties tested; Wintock, a winter oat, was considerably more resistant to heat and cold than Kanota.

Advanced strains resistant to stem rust, crown rust and smut were tested.

The study of varietal susceptibility to *Colletotrichum graminicolum* is in progress.

Maize

Hybrid production is reported.

Barley

In breeding for resistance to *Ustilago nuda* at the Fort Hays Substation, the following crosses have been made: Mykden Black x Flynn, Dorsett x Trebi, Beecher x Trebi and Flynn x (Trebi-Wisconsin Barbless).

Sorghum

Breeding for smut resistance was continued. It is hoped to release the milo disease resistant Colby variety.

Considerable varietal differences in yield of wax and oil are reported.

Varieties have been analysed for their starch properties.

In work at the Fort Hays Substation, wide variation in the niacin content of sorghum varieties has been observed. The F_2 of the cross Westland x Cody showed transgressive inheritance for niacin content.

Midland, a new sorghum suitable for combine harvesting, has been released by the Fort Hays Substation.

Forage grasses

Selection of *Andropogon furcatus* and *A. scoparius* is being carried out.

Selections of brome grass are under test.

Sudan grass is being selected for improved forage type and resistance to leaf diseases and chinch bug.

Lucerne

Highly self-sterile selections obtained from the polycross nursery were studied. Wide variation in the vitamin A content of selections has been noted.

Extensive investigations on insect pollination are being carried out.

Flax

The release of the new Koto variety is reported.

Sesame

Progress has been made in the selection of strains which are more suitable for harvesting by machine than their parents. The crop appears to have promise as a source of oil.

Cowpea

Breeding is in progress. Blackeye hybrids have exhibited resistance to *Phytophthora vignae*.

Soya bean

Breeding is reported.

1041.

575:633(78.3)

Agricultural research in South Dakota.

58th Rep. S. Dak. Agric. Exp. Sta. 1944-1945 : Pp. 47.

Cereals

Wheat, oats and barley breeding is in progress.

A leaf rust resistant wheat strain derived from the cross Rival x Thatcher is being increased. Two barley strains developed from the crosses Peatland x Vaughn and Peatland x Dryland, respectively, are also being increased; both strains give good yields, and are stiff-strawed and stem rust resistant.

The production of hybrid maize is reported.

Sorghum

Hybrids between forage and grain sorghum are being studied with regard to their adaptability, earliness, yield, and resistance to drought and disease.

Forage crops

Lines of *Festuca rubra*, *Agropyron desertorum*, *A. trichophorum*, *A. intermedium*, and three lucerne varieties were selected; observations on resistance to root rots and blight were included.

Selection of *Kochia* is reported.

The new Ree wheatgrass has been released (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 793).

The release of Rancher, a new forage sorghum variety with low hydrocyanic content is reported (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 790).

Potato

Lines were tested for scab resistance. A line from the cross Hindenberg x Katahdin, which has shown marked resistance, is to be further studied.

Pome fruits

The new Hansen Seedless and Sodak pear varieties were released (cf. *Plant Breeding Abstracts*, Vol. XVI, 892).

The new Kasha apple variety and the Ata and Kensib crab-apples were also introduced (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 892).

Tomato

Breeding for disease resistance is being carried out; wild species are under test.

1042.

575:633(78.7)

Fifty-fourth Annual Report of the University of Wyoming Agricultural Experiment Station 1943-1944 : Pp. 47.

Cereals

Varietal trials of wheat, oats and barley are reported.

Potato

The resistance of varieties and seedlings to ring rot and scab is under investigation. Breeding work also includes trials for psyllid yellows resistance, hybridization involving commercially desirable seedlings and disease resistant seedlings, and selection of Bliss Triumph.

Bean

Varietal resistance of the garden bean to common and halo blight was investigated; the results of tests of resistance to white mould are also reported.

1043.

575:633(78.8)

Fifty-seventh Annual Report of the Tennessee Agricultural Experiment Station, 1944 : Pp. 107.

Wheat

Selection for rust resistance is reported.

Oats

Stiffness of straw continues to be the chief objective in breeding. Bond x Fulghum 090 and Victoria x Fulghum 090 strains show promise of combining good yielding capacity and winter hardiness with increased resistance to lodging.

Maize

Hybrid production is in progress.

Barley

Smooth-awned barleys have been crossed with Polders and Wong, and with the hooded barleys No. 6 and Missouri Beardless, with the aim of securing stiffer strawed varieties; promising early smooth-awned selections have been obtained.

Forage crops

Selection of smooth brome, meadow fescue, tall oat grass, Harding grass, cocksfoot, timothy and fescue grass is reported.

F₁ hybrids between Texas bluegrass and Kentucky bluegrass are under investigation, in the attempt to develop a vigorous bluegrass resistant to heat and drought.

Trials of button clover (*Medicago orbicularis*) are in progress.

Inbred lines of red clover selected for resistance to anthracnose and powdery mildew and for uniformity in plant characters and seed colour have been secured. Inbreeding has been found to result in marked loss of hybrid vigour; hybrid combinations between these inbreds are therefore to be studied.

Cotton

Varietal trials are reported.

Wilt resistant selections from crosses between resistant cottons, including Sea Island and Upland varieties, are to be tested for yield.

Tobacco

Breeding of mosaic resistant dark tobacco is being carried out.

Pear

Promising selections are under trial. New hybrid seedlings have been secured. Selected seedlings showing some degree of fire blight resistance were propagated on *Pyrus Calleryana* stocks.

Rubus

Black raspberry crosses have been successful; red raspberry breeding is being carried out.

R. macrocarpus has been crossed with Eldorado, Himalaya and other blackberry varieties.

Watermelon

Breeding for resistance to *Fusarium* wilt is receiving attention.

Tomato

Hybrids of *Lycopersicon esculentum* and *L. hirsutum* have so far proved susceptible to *Alternaria* leaf spot. Hybrid selections from Missouri and certain varieties, including Pan America, have shown complete resistance to *Fusarium* wilt.

1044.

575:633(79.6)

Agricultural research in Idaho.

53rd Rep. Idaho Agric. Exp. Sta. 1946 : Bull. No. 268 : Pp. 60.

Wheat

In winter wheat breeding, the Relief and Wasatch varieties are being used to improve winter hardiness and disease resistance, Elgin and Brevon to increase shortness and stiffness of straw.

Spring wheat breeding aims at the production of a rust resistant variety with the general characteristics of Idaed. Selections from crosses of Federation, Idaed, and Australian Selection Idaho 735 with Premier, a rust resistant hard red spring wheat, are under test for yield and quality.

Oats

A new variety produced from the cross (Victoria x Richland) x Bannock is to be named and distributed in 1946; it was obtained in co-operation with the U.S. Department of Agriculture.

The new variety C.I.4181, also obtained through co-operation with the U.S. Department of Agriculture, was released by the Aberdeen Sub-station. C.I.4181 is resistant to smut and partly resistant to stem and crown rust; its parentage includes Bannock, Victoria and Richland; its chief advantage is its short stiff straw in comparison with Bannock.

Maize

Hybrid breeding is being carried out.

Barley

The release of a new spring barley, Gem (Idaho 2157), is reported; the variety was developed from the cross Vaughn x Atlas No. 35. Gem has outyielded Trebi during a nine-year period by over 20%; it is smooth-awned, and slightly earlier than Trebi.

Winter barley varieties are under test for winter hardiness.

Forage grasses

Selection of cocksfoot, smooth and mountain brome, *Agropyron intermedium* and creeping fescue is in progress.

Cherry

The new Lamida variety, resistant to fruit cracking, has been introduced (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 1400).

Onion

Breeding to improve storage and dehydration quality is being carried out. Preliminary experiments show that refractive index, indicating the percentage content of soluble solids, can serve as a basis for selection.

Tomato

Use of a wild tomato from Chile in breeding for curly top resistance is reported.

Bean

Selection for curly top resistance in beans is described. A new pinto bean variety was released, which is early maturing and resistant to mosaic and curly top. The new variety has been developed from a cross between the susceptible common pinto bean and the resistant Red Mexican U.I.34.

Pea

Crosses of Alaska and First and Best with Arthur, Golden Vine and Green Scotch were selected for pea colour, resistance to bleaching, seed roundness, determinate type of haulm, early maturity and wilt resistance.

1045.

575:633(79.7)

Fifty-fifth Annual Report of the Washington Agricultural Experiment Station for the fiscal year ended June 30, 1945 : Bull. No. 470 : Pp. 167.

Wheat

Data from the F_2 and F_3 generations of the cross Golden x Hymar showed that the characters of resistance or susceptibility to bunt races L8 and T16, club or lax spikes, brown or white chaff, purple or white straw, were each determined by a single gene difference, and were independently inherited. Plant height also appeared to be conditioned by a single pair of independent factors.

Factors for bunt resistance derived from Hymar, Rex, Ridit-Hohenheimer, Hussar-Hohenheimer and Oro-Turkey Florence 9 have been successfully transmitted by the back-cross method. The transference of the bunt resistance of Hymar to Elgin is receiving particular attention.

Two winter wheat selections of the cross Rex x Rio showed resistance to all races of bunt; four other selections were resistant to all races except T16 and L8. Among the spring wheats tested for bunt resistance, Doubbi, a *Triticum durum* variety from Australia, exhibited resistance to all races except T2.

Hybridization has also been carried out to obtain types of Elgin, Brevon and Orfed showing improvements in several economic characters.

Advanced progenies of wheat x *Agropyron elongatum* are under test for winter hardiness and rust resistance.

Investigations on the inheritance of reaction to stem and leaf rust, of male sterility, and of smooth awns are in progress.

The Golden variety continued to show outstanding resistance to flag smut.

Oats

All varieties tested proved highly resistant to smut.

Barley

F_3 and F_4 progenies of winter barley hybrids developed by back-crossing to White Winter or by pedigree selection, combine the characters of short straw and earliness with the winter hardiness and head and grain type of White Winter.

The inheritance of abnormal characters in spring barley is being studied. Colchicine-induced tetraploids have been secured for the purpose of investigating tetrasomic segregation of some of the gene pairs commonly used to test linkage in barley. Stiff-strawed, high-yielding selections of the cross Atlas x Barbless have been obtained, and are to be further tested.

Forage grasses

Primar, an improved strain of slender wheat grass (*Agropyron trachycaulum*, P-2535), has been produced. It is vigorous, semi-erect and long-lived; the seed ripens ten days earlier than the seed of the late commercial strains, and the strain grows several inches taller. It produces abundant foliage, and is resistant to leaf and stem rust, head smut and stripe rust. Bromar, an improved strain of mountain brome (*Bromus marginatus*, P-3368), has also been selected. It is tall, leafy and vigorous, and gives a good early spring recovery and seed yield. Bromar matures about two weeks later than the commercial strain, and is thus very suitable for use with sweet clover for pasture and green manure; it is also highly resistant to head smut.

Potato

Varietal adaptability and resistance to leaf roll and flea beetle are under investigation. A cross between Earlane and White Rose is being studied with a view to obtaining an early, long, flat white potato, with a more satisfactory shape than White Rose.

Fruits

Work on the identification of cherry varieties is reported.

Cranberry breeding is in progress.

Breeding blueberries for uniformity of ripening and freedom from cracking is also reported. Hardiness and disease resistance are receiving attention in raspberry breeding. It has been observed that Taylor transmits large berry size to hybrid seedlings, but is inferior to Cuthbert and Washington in transmitting good flavour. The Milton variety is to be used in further crossing. Certain varieties and inbred seedlings have exhibited resistance to the aphid, *Amphoraphora rubi* Kalt.

Hybridization to produce an earlier ripening Evergreen blackberry is reported.

The Sparkle strawberry is being used as a parent in breeding for red core resistance, and Brightmore for yellows resistance; U.S.D.A. and local hybrids are being used as sources of resistance to black root. A large number of hybrid seedlings are under test for yield, dessert and freezing qualities, and other commercial characters.

Cabbage

It has been noted that round headed varieties, with the exception of Copenhagen Market, are more tolerant to ring spot (*Mycosphaerella brassicola*) than other varieties.

Pea

Hybrid vigour and combining ability were studied in bulk F_2 populations of several crosses. It is hoped to obtain a variety yielding deep green, smooth seeds from the second back-cross of Alaska x Green Scotch to Alaska. Resistance to bleaching and *Fusarium* wilt, early maturity, and larger haulms suitable for combine harvesting are also receiving attention in breeding work.

The inheritance of seed coat colour and linkage relationships of abnormal plant types are being studied. Plants derived from X-ray treated seed of Alaska are to be observed for mutations.

F_4 lines of the cross Austrian Winter x Alderman were selected for winter hardiness.

1046. BECKMAN, I. 575:633(81)
Trabalhos fitotécnicos da Estação Experimental de Bagé. (Plant
breeding work of the Bagé Experimental Station).
Rev. Fac. Agron, Univ. Montevideo 1943 : No. 33 : 9-48.

This address contains the following items of interest to plant breeders:—

Wheat

Three new varieties, Rio Negro, from Surpresa x Centenario, Centeira, from Centenario x Frontiera, and Frontana, from Fronteira x Mentana, have been produced for the region of

the Rio Grande do Sul. The first outyields Fronteira at Bagé and Passo Fundo, the second outyields the same standard variety at Encruzilhada and Juilo de Castilhos, and the third has proved superior at Dom Pedrito.

An account is also given of the genetic determination of yield in wheat and the morphological characters on which it depends.

Oats

Two new varieties, Bagé and Dom Pedrito, for the Rio Grande do Sul district, have been selected from a field near Dom Pedrito. F2 au 12, a variety from La Estanzuela, and Saia, a form of unknown origin, have also been investigated.

Maize

The variety Farroupilha was selected some time ago by the Fronteira Experimental Station from the old variety Assis Brasil. From this selection, the variety Farroupilha A x B has been developed at Bagé.

Barley

The selection Continental B has been made from the South American variety Continental from which it differs in its increased yield.

Flax and Linseed

Mention is made of three fibre varieties, Viamão, Farroupilha and Caxias, bred at the Porto Alegre Experimental Station. Most of the varieties grown in the Rio Grande do Sol region are however for oil, and 14 locally adapted strains have been selected at Bagé. Varieties have also been tested for their susceptibility to severe lodging, a condition whose cause is as yet unknown.

Beans

Regionally adapted varieties are being selected.

Peas

Variety trials are reported.

1047. CROSS, W. E. 575:633(82)

Memoria Anual del año 1944. (Annual Report for the year 1944).

Rev. Industr. Agríc. Tucumán 1946 : 36 : 5-85.

In this report of the work of the Tucumán Experimental Station, the following points of interest to plant breeders are included:—

Sugar cane

Extensive varietal trials for smut resistance and improved quality have been carried out. White and striped mutants of several varieties have been studied; in some cases these have proved better than the normal forms in quality and yield of sugar, in other cases they have been worse.

Tung

Selection work is reported.

Citrus Fruits

Tests of suitable stocks have been made.

1048. 575:633:575.1(48.5)

MÜNTZING, A.

633.42:575.127.2:635.15

Den teoretiska genetiken och växtförädlingen. (Theoretical genetics and plant breeding).

Sverig. Utsädesfören. Tidskr. 1946 : 56 : 582-87.

A concise survey is given of the development of genetical theory in relation to plant breeding from Darwin's time to recent work of Swedish and American investigators, with reference to discoveries relating to mutation, chromosome doubling, irradiation, colchicine effects, inbreeding and degeneration.

Special mention is made of the work of G. Ólsson and his collaborators in producing Indian mustard by crossing turnip rape and black mustard, and thus obtaining plants with the combined chromosome complement of the two parent species.

New rapes and Indian mustard may, it is thought, be synthesized by combinations such as white mustard and oil radish, or rape and turnip rape, or cabbage and turnip rape. Similar work with rye-wheat is promising, and a 70-chromosome type should be obtainable by combining ordinary wheat with tetraploid rye, which is more fertile than ordinary rye. Good results are also expected from inbreeding studies of diploid and tetraploid Stål (Steel) rye in relation to problems of degeneration and combination effects.

1049. IPATJEV, A. N. 575:633:578.088
(Underlying regularities in the composition and structure of variety populations).

Trudy Omsk. Sel'skhozhojstvennogo Inst. imeni S.M. Kirova (Trans. Kirov Inst. Agric. Omsk, U.S.S.R.) 1939 : 4 (17) : 109-26.

This paper is a further elaboration of the ideas put forward in the article reviewed in *Plant Breeding Abstracts*, Vol. IX, Abst. 985.

1050. HAAN, H. DE 575:633:582(49.2)
De ontwikkeling en de beteekenis van de rassenlijst voor landbouwgewassen (1924-1944). [Development and importance of the list of varieties of agricultural crops (1924-1944)].
Landbouwk. Tijdschr. 1944 : 56 : 78-86.

The history and outstanding advantages to grower and breeder of the Dutch official list of varieties of agricultural crops are described at length. The list of seeds and seed potatoes is based on experimental work and practical experience, and has stimulated public opinion in regard to the qualities of the different varieties, and has encouraged the demand for organized variety testing.

The editor of the list has required short names easy to pronounce and write, and all synonyms have gradually disappeared. The legal protection of the breeder has been promoted, and the standard of catalogues using the list will be improved. It is also of value as an aid in inspection of crops and in the importation of varieties and in propaganda abroad.

The list provides the breeder with a survey of important Dutch and foreign varieties and assists him in the selection of parents for hybridization.

*GENETICS 575.1

1051. SIRKS, M. J. 575.1(47)
Lysenko's genetika. (Lysenko's genetics).
Vakbl. Biol. 1947 : 27 : 8-13.
[Also Landbouwk. Tijdschr. 1947 : 59 : 17-21.]

A review is presented of Dobzhansky's English translation of Lysenko's article on *Heredity and its variability* and a detailed discussion follows on *The New Genetics in the Soviet Union* by Hudson and Richens, in which Lysenko's scientific views are presented from the original sources and against their historical and political background.

The author's own views on the "Lysenko problem" conclude the critique.

1052. WANSCHER, J. H. 575.1:001.4:635
635:578.088
Om Begreberne Sort og Stamme m.v. samt om Principperne for Navngivningen og Katalogiseringen af Køkkenurter og for Begraensningen af Sorts- og Stammeantallet. (On the concepts, variety and strain etc. and on the principles relating to the naming and cataloguing of vegetables and to the limitation of the number of varieties and strains).

Nord. JordbrForskn. 1942 : No. 7 : 341-56.

In view of the confusion prevailing as to the meaning of the words "variety" and "strain", the author sets out to clarify the various designations ordinarily used in describing the different forms with reference to vegetables, and then to define the principles that should govern nomenclature and the limitation of varieties and their strains.

A variety is defined as corresponding, in vegetatively produced species, in the main to a

* General studies, see also individual crops.

clone; in self-fertilizing species, to a pure line; and in cross-fertilizing species, first to one strain and subsequently to many strains. The correspondence between a variety and a particular clone will not hold for a markedly aberrant mutant arising from the clone. In that case the mutant would receive a separate name and would rank as a separate variety. The implications of the above definitions are discussed in detail.

1053. BOERGER, A.

575.11:581.9

Centros de genes en la América del Sur. (**Gene centres in South America**).

Pensamiento Peruano, Lima 1945: 58-63.

After reviewing the theories of Darwin, Johannsen and Mendel that paved the way for Vavilov's theory of centres of origin, the author presents an account of the centres of origin of some of the more important cultivated plants, paying special attention to the potato and other Central and South American crops.

1054. HULL, F. H.

575.113.4:519.24

Theoretical regression of F_N on homozygous parents with additive or complementary gene action.

Genetics 1947: 32: 90-91. (Abst.).

"For n uniform sets of m complementary genes let phenotypic interval of each set be $(2d)^m$, total interval $n(2d)^m$, dominance deviation of any single pair kd , bottom recessive T , and proportions of loci AA in P_1 and P_2 respectively u and w .

$$F_N = \left[\left(\frac{1}{2} + \frac{k}{2^n} \right) (P_1 - T)^{1/m} + \left(\frac{1}{2} + \frac{k}{2^n} \right) (P_2 - T)^{1/m} - \frac{k}{n^{1/m} 2^n d} (P_1 - T)^{1/m} (P_2 - T)^{1/m} \right]^m + T$$

$$\frac{\partial (F_1 - T)}{\partial (P_2 - T)} = 0, \text{ when } \frac{1 + k}{2k} = \frac{(P_1 - T)^{1/m}}{n^{1/m} 2d} = u$$

When $m = 1$ gene action is additive, regression of F_1 on P_1 and P_2 is curved solely by dominance. Regression of F_1 on P_2 with constant P_1 is linear and a function of P_1 . If $k = 1$ (dominance complete) regression of F_1 on P_2 is zero when $u = 1$. If $k > 1$ (overdominance or selective advantage of heterozygote), regression of F_1 on P_2 is zero when $u = (1 + k)/2k$. Regression of F_1 on P_2 is positive with lesser values of u and negative with greater values. When $m > 1$ gene action is complementary (multiplicative). Regression of F_1 on P_1 and P_2 is curved by dominance and by epistasy. Regression of F_1 on P_2 with constant P_1 is curved by epistasy. The partial regression is still zero when $k = 1$ and $u = 1$, or when $k > 1$ and $u = (1 + k)/2k$. In the latter event partial regression is positive and concave downward with lesser values of u , or negative and concave upward with greater values. Partial regression is a function of both P_1 and P_2 . Regression coefficients are unaffected by linkage, or by non-genetic variation". [Author's summary.]

1055. SMITH, L.

575.125:581.162.5:578.08

Possible practical method for producing hybrid seed of self-pollinated crops through the use of male-sterility.

J. Amer. Soc. Agron. 1947: 39: 260-61.

It is suggested that, since many male-sterile plants are fertile if grown under different environmental conditions from usual, it should be possible to obtain homozygous, fertile but potentially male-sterile lines of self-pollinated crops, by growing them in suitable localities. They could then be transferred to regions where they are male sterile, and could thus be used for obtaining heterotic hybrids.

1056. CUMMINGS, J. M.

575.127.2:576.354.46

Chromosomes of *Datura ceratocaula* in hybrids obtained by embryo dissection, an advance report.

Genetics 1947: 32: p. 84. (Abst.).

Hybrids between the aberrant species *D. ceratocaula* and nine other *Datura* spp. were

secured by embryo dissection and culture. Information is given on the chromosome pairing observed at metaphase I in the pollen mother cells of the hybrid. It was found that the chromosomes formed bivalents and configurations similar to those observed in intraspecific crosses between races and interspecific crosses between the more closely related *Datura* spp.

1057. FRANDSEN, K. J. 575.14:575.12:581.162.5:633
Iagttagelser over Indavl og Udavl hos fremmedbefrugtende Planter.
(Observations on inbreeding and outbreeding in cross-fertilized plants).

Nord. JordbrForskn. 1943 : Nos 5-6 : 218-36.

The historical background of the study of degeneration from inbreeding and of heterozygosis is reviewed. The existing differences of opinion on these problems of inbreeding and outbreeding mean, for the plant breeder, uncertainty in choosing his methods in breeding cross-pollinated plants. In using family breeding, there is a choice between two main ways of proceeding: inbreeding, self or sib pollination; or outbreeding, crossing by pairs or groups, or open-pollination. Bearing on this, the following three questions are discussed in this paper: (1) should inbreeding or outbreeding be used in producing progenies; (2) is the effect of the two methods so different that inbreeding may lead to the assessment of certain families as superior, whereas with outbreeding other families would appear as the best; and (3) in producing strains, can inbreeding and its effects in the F_2 and later generations be avoided by crossing enough families together? Answers to these three questions were derived from experiments at Østoftegaard with the cross-fertilized crops, timothy, ryegrass and sugar mangels. It appeared that inbreeding or outbreeding will result in the same families being recognized as the best, a finding in keeping with Jones' Mendelian interpretation of inbreeding and heterosis. The experiments showed that the parent plants and the subsequent families have an innate value, and that it is not only their actual combination in crossing which leads in some cases to the production of outstanding individuals from the intercrossing of two inferior families. That some families give a larger yield with both inbreeding and outbreeding can be explained on the assumption that they carry a larger number of favourable dominants for growth.

The subsequent discussion elicited further detailed evidence in support of the lecturer's theory. In building commercial strains, degeneration in the F_2 and later generations due to inbreeding can be avoided by crossing four or five not too closely related families.

1058. MÜNTZING, A. 575.14:633.1
Kritisk översikt över inavelsteorierna. (A critical survey of theories about inbreeding).

Nord. JordbrForskn. 1943 : Nos 5-6 : 237-49.

The stimulation and plasmon theories and East's theory of inbreeding are regarded as still purely hypothetical, but Jones' theory of dominance is shown by analysis to fit a comprehensive body of experimental results with maize, rye and other species of plants and also *Drosophila*.

The decrease in viability on inbreeding, formerly attributed to true gene mutations, may, it now appears, be due to structural alterations in the chromosome which are probably the cause of the partial sterility found in populations of cross-pollinating plants. In any event degeneration due to inbreeding cannot be regarded as a purely Mendelian phenomenon. In rye, at least, inbreeding often leads to complete disturbance of meiosis, which in turn often leads to the extinction of inbred lines and explains why some lines, in spite of prolonged inbreeding, do not attain a constant inbreeding minimum.

1059. BONNIER, G., 575.17
RASMUSON, B. and 575.116.1
RASMUSON, M.
"Gene divisibility", as studied by differences in Bar facet numbers in *Drosophila melanogaster*.

Hereditas, Lund 1947 : 33 : 348-66.

Differences in the facet number of eight lines of *D. melanogaster* of the constitution $B\ Eb\ /\+$ are reported. Since it is thought highly probable that all these strains carried the same

genes, it is suggested that the differences in facet number are due to the fact that the gene *Eb* and possibly the gene *B* are not point genes, but are extended linearly. Differences in the strains could then be explained on the assumption that crossing-over and recombination had affected different lengths of the genes concerned.

1060. MORGAN, L. V. 575.17:576.312.341
A variable phenotype associated with the fourth chromosome of *Drosophila melanogaster* and affected by heterochromatin.
 Genetics 1947 : 32 : 200-19.

The gene *spa* is expressed variously according to the proportion of heterochromatin to euchromatin in the nucleus; with an increase in the proportion of heterochromatin, its effect is reduced.

1061. RAPOPORT, J. A. 575.17:581.04
On the synthesis of gene-products in equimolecular quantities.
 Amer. Nat. 1947 : 81 : 30-37.

A series of *Drosophila* phenocopies have been obtained after treatment with various chemical substances, believed to act as enzyme inhibitors. The effective doses of the inhibitors could be related to their molar concentration.

1062. SONNEBORN, T. M.,
 DIPPELL, R. V. and
 JACOBSON, W. 575.182:577.1
Some properties of kappa (killer cytoplasmic factor) and of paramecin (killer substance) in *Paramecium aurelia*, variety 4.
 Genetics 1947 : 32 : p. 106. (Abst.).

Through the action of the cytoplasmic factor, κ , the gene *K* in *P. aurelia*, variety 4, controls the production of a killer substance, paramecin. Investigations on the properties of the κ substance and paramecin are reported.

VARIATIONS, MODIFICATIONS, MUTATIONS 575.2

1063. WEIR, J. A. 575.24
A source of genes for evolutionary progress.
 Genetics 1947 : 32 : 111-12. (Abst.).

The author suggests that the improbability of a favourable mutation of a gene already performing essential functions and the limitation of gene number imposed by the size of the nucleus render classical concepts of progressive evolution untenable. The hypothesis of neutral genes is put forward to meet this difficulty. A neutral gene is defined as one which has lost its essentiality to the organism and is free to become incorporated in a different gene system, thus providing potential material for mutation without a change in the number of loci.

1064. LITTLE, C. C. and
 HUMMEL, K. P. 575.24:575.113.3
A reverse mutation to a "remote" allele in the house mouse.
 Proc. Nat. Acad. Sci. Wash. 1947 : 33 : 42-43.

A case is recorded of a mutation in the mouse, *a* to *A*^w, which involved the by-passing of members *a*^t and *A* of the same allelomorphic series. The latter two genes are intermediate in dominance relations between *a* and *A*^w.

1065. MAMPELL, K. 575.24:575.17:575.182
Genic and nongenic transmission of mutator activity.
 Genetics 1946 : 31 : 589-97.

Investigations on the recessive mutator gene located in chromosome II of *Drosophila pseudoobscura* are reported. The mutator gene, in presence of a Y chromosome, determines the production of a mutator substance which is responsible for the induction of mutations, and is transmitted through the cytoplasm of the egg and sperm. The nature and action of the mutator substance is discussed, and reference is made to the significance of such a substance in connexion with possible modes of origin of viruses.

1066. C., R. 575.243:537.531:007
Dr Muller receives Nobel medicine award.
 J. Hered. 1946 : 37 : 325-26.

A discussion is given of the significance of H. J. Muller's work on the genetical effects of X-ray treatment, to both the genetical and medical sciences.

1067. HOLLAENDER, A. and
 SWANSON, C. P. 575.243:537.531:537.61-15
Modification of the X-ray induced mutation rate in fungi by pretreatment with near infrared.
 Genetics 1947 : 32 : p. 90. (Abst.).

In experiments on *Aspergillus terreus* and *Trichophyton mentagrophytes*, a significant increase in X-ray induced mutations was obtained by irradiation of the spores with near infra-red light before the X-ray treatment. Infra-red treatment alone did not induce mutation.

1068. KING, E. D. 575.243:537.531:581.036
Effects of temperature during X-radiation on *Drosophila*.
 Genetics 1947 : 32 : 93-94. (Abst.).

Males of *D. melanogaster* were subjected to X-ray treatment at low temperatures and room temperature. At low temperatures the frequencies of induced mutations for all dosages were approximately twice as great as those for the same dosages at room temperature.

- 1069 KING, E. D. 575.243:581.036:537.531
The effect of low temperature upon the frequency of X-ray induced mutations.
 Genetics 1947 : 32 : 161-64.

The frequency of induced lethal mutations in X-irradiated *Drosophila* stocks was found to be, on an average, 2.3 times greater at 0.5° C. than at room temperature. At both temperatures, dosage and mutation frequency were related linearly.

1070. AUERBACH, C.,
 ROBSON, J. M. and
 CARR, J. G. 575.243:581.04
The chemical production of mutations.
 Science 1947 : 105 : 243-47.

Mustard gas has been found an efficient mutation inductor for *Drosophila* and *Tradescantia*, and it also brings about chromosome aberrations. In contrast to X-irradiation, mustard gas appears to bring about relatively fewer chromosome breaks in proportion to the number of lethal mutations. Another difference from X-irradiation is constituted by the fact that, after treatment with mustard gas, mosaicism is frequent; in one case, an F₁ offspring was also a mosaic. To explain the latter occurrence, it is suggested that the mutants induced by mustard gas are unstable, and continue to change for some time after treatment. Three other substances have shown a similar efficiency in inducing mutation to that of mustard gas, viz. O(CH₂·CH₂·S·CH₂·CH₂Cl)₂, N(CH₂·CH₂Cl)₃ and CH₃·N(CH₂·CH₂Cl)₂. The possible connexion between mutagenic power and chemical constitution is discussed. Finally, it is suggested that mutation under natural conditions might be caused by the presence of chemical mutagens within the organism.

1071. STRONG, L. C. 575.243:581.04
The induction of germinal mutations by chemical means.
 Amer. Nat. 1947 : 81 : 50-59; also
 Genetics 1947 : 32 : 108-09. (Abst.).

An account is given of a series of mutations induced in mice by means of methylcholanthrene.

1072. DERMEN, H. 575.25:634.76
Histogenetic basis of some bud sports and variegations.
 Genetics 1947 : 32 : 84-85. (Abst.).

Cytological investigations of *Datura* and the cranberry have indicated that the short apex has three distinct primary histogenetic layers. By the use of colchicine, polyploidy has been induced in each layer separately. The author suggests that possibly all angiosperms are characterized by distinct apical layers, the dicotyledons possessing three layers and the monocotyledons two. The layers remain distinct on account of the difference in the mode of cell division in the layers. In *Datura*, it appears that cell division in the short apex is usually anticlinal in the first and second layers, while in the third layer both anticlinal and periclinal divisions occur. In the cranberry, cell division in the first layer is anticlinal but occasional periclinal divisions are observed in the second layer. A natural or artificially induced somatic mutation is confined to one layer only, resulting in the formation of the periclinal type of somatic mutation, such as colour sports in apples and thornless mutants in blackberries. The author interprets the formation of variegated leaf patterns on the basis of variability in the cell division of the first and second layers.

SELECTION 575.4

1073. DUBININ, N. P. and
 TINIakov, G. G. 575.41:576.356.2
Inversion gradients and natural selection in ecological races of
Drosophila funebris.
 Genetics 1946 : 31 : 537-45.

The effect of natural selection upon a certain inversion was investigated in populations of *D. funebris*. Natural selection was found to favour heterozygotes for the inversion to a greater extent than normal homozygotes, while it favoured the latter more than homozygotes for the inversion. The results are described as a case of intrapopulation heterosis. The action of natural selection was, however, somewhat complex, since during hibernation the normal homozygotes were favoured at the expense of both the heterozygotes and homozygotes for the inversion, and the action of natural selection was different in rural and urban populations.

1074. LARROQUE, P. 575.42:519.24(59.7)
 Principes et méthodes de la sélection rapide des plantes, basée sur la
 considération des complexes héréditaires. (**Principles and methods**
of rapid selection of plants based on the consideration of heredit-
ary complexes).
 Agron. Trop. 1946 : Nos 11-12 : 563-81.

A method of selective breeding is described based on the statistical treatment of data on the way in which phenotypic characters are associated together during inheritance. The determination of the associated groups of phenotypic characters is exemplified with reference to the castor-oil plant, maize and tung.

A schedule is appended of the breeding work that has been carried out in Indo-China along these lines.

*CYTOLOGY 576.3

1075. CUNHA, A. G. DA 576.3
 Le chondriome végétal et son évolution. (**The plant chondriome and**
its development).
 Brotéria 1944 : 13 : 49-72.

In this review on the relationship between plastids and mitochondria, the author criticizes the theory of duality associated with Guilliermond. It is stated that, in most plants, the plastids differentiate from the mitochondria, though in various algae, *Anthoceros* and *Selaginella*, chloroplasts may arise from the division of pre-existing plastids.

* General studies, see also individual crops.

1076. MICHAELIS, P. 576.311:576.312:575.17
Experimentelle Untersuchungen über die geographische Verbreitung von Plasmon-Unterschieden und der auf diese Unterschiede empfindlichen Gene, sowie deren theoretische Bedeutung für das Kern-Plasma-Problem. (**Experimental research on the geographical distribution of plasmon differences and of the genes sensitive to these differences as well as their theoretical significance in the problem of the relation between nucleus and plasma**).
Biol. Zbl. 1942 : 62 : 170-86.

In this study of *Epilobium hirsutum* races, in which a new type of plasmon has been identified, the author discusses the problem of how plasmon differences arise. E. W.

1077. SPARROW, A. H. and HAMMOND, M. R. 576.311:576.354.4
Desoxyribonucleic-acid-containing bodies in the cytoplasm of pollen mother cells at early meiotic prophase.
Genetics 1947 : 32 : p. 107. (Abst.).

Feulgen-positive bodies are reported in the cytoplasm of the pollen mother cells of *Lilium*, *Trillium*, *Allium*, *Paeonia* and other genera. The bodies apparently originate in the nucleus or at the nuclear membrane, and later migrate into the cytoplasm. They show great variation in position, size and shape, and in their effect upon nuclear morphology. The authors suggest that the cytoplasmic bodies may function as a modification of the more common type of heterochromatin-nucleolus mechanism controlling the synthesis of nucleic acid. They could thus play a part in the synthesis of the high concentrations of ribose nucleic acid present in the cytoplasm of pollen mother cells at the early stages of meiotic prophase.

1078. MONNÉ, L. 576.311:581.192
Struktur- und Funktionszusammenhang des Zytoplasmas. (**The structural and functional relations of the cytoplasm**).
Experientia, Basel 1946 : 2 : 153-59.

A review is presented of recent work on the physical and biochemical properties of the cytoplasm. The bulk of the cytoplasm appears to have a fibrillar structure, the fibres consisting of polypeptide chains composed of chromidia and interchromidia. Special attention is paid by the author to the chromidia, which are believed to be small bodies, hardly exceeding 0.1μ in diameter, and in which nucleic acid is present, possibly linked, together with phosphate molecules, to calcium ions. In several respects, the chromidia may be compared with the once-postulated biogen molecules. They act as loci for protein synthesis; they are probably cytoplasmic growth centres, and they appear to respire and exhibit irritability. These last two characteristics distinguish them from viruses.

A careful distinction is drawn between chromidia and mitochondria, for it is believed that nucleic acid is only present in insignificant quantity in the latter bodies.

1079. DOBSON, W. J. 576.312:581.192
The effects of phosphorus starvation on the nucleic acids of *Tradescantia virginiana*.
Amer. J. Bot. Suppl. 1946 : 33 : p. 834. (Abst.).

The amount of nucleic acid in the nuclei of *T. virginiana* is proportional to the quantity of phosphorus available to the roots.

1080. BOIVIN, A. and VENDRELY, E. 576.312.2
Sur le rôle possible des deux acides nucléiques dans la cellule vivante. (**The possible role of the two nucleic acids in the living cell**).
Experientia, Basel 1947 : 3 : 32-34.

It is suggested there are a large number of different desoxyribose nucleic acids and ribose nucleic acids. Further, it is thought that there exists in the nucleus of each cell of an organism, a particular concourse of desoxyribose nucleic acids regulating the basic processes

of the cell, and responsible for the appearance of the characteristics of the species. Secondary regulatory centres, consisting of ribonucleic acids, are believed to be present in the cytoplasm, these differing in composition according to the type of cell. The secondary centres are regarded as exerting a direct effect on cellular metabolism and on the ontogeny of the organism.

1081. JEENER, R. 576.312.2
 Sur les liens de la phosphatase alcaline avec les nucléoprotéides du noyau cellulaire et des granules cytoplasmiques. (**The bonds between the alkaline phosphatase and nucleoproteins of the cell nucleus and cytoplasmic granules**).
 Experientia, Basel 1946 : 2 : 458-59.

Both the nuclei and the cytoplasmic granules may be resolved biochemically into two components: a nucleoprotein fraction soluble in a 0.6 M solution of KCl, and an insoluble fraction consisting largely of alkaline phosphatase.

1082. SMITH, B. W. and SMITH, M. T. 576.312.332
Sex chromosomes in *Rumex hastatulus* Baldw. with XY₁Y₂ pairing.
 Genetics 1947 : 32 : 104-05. (Abst.).

Female plants of the dioecious species, *R. hastatulus* Baldw., were found to have a chromosome number of $2n = 8$, male plants a chromosome number of $2n = 9$. In previously investigated dioecious species of *Rumex*, chromosome numbers of $2n = 14$ and $2n = 15$ for the female and male plants, respectively, have been reported. It appears therefore that $2n = 8$ and 9 represent a new basic number for the dioecious species of *Rumex*.

At metaphase II, one cell of the dyad contains three autosomes and the X chromosome, while the other contains three autosomes and the Y₁ and Y₂ chromosomes. A description is given of the characteristics of the autosomes and sex chromosomes.

1083. VALENCIA, R. M. 576.312.341:576.356.2
Is there transmission of the effect of heterochromatin on variegation in *Drosophila*?
 Genetics 1947 : 32 : 109-10. (Abst.).

Experiments are in progress on the influence of heterochromatin on the position effect of certain genes causing variegation in *Drosophila*, which are placed in proximity to the heterochromatin as the result of chromosome rearrangement.

1084. CLEVELAND, L. R. 576.35
The origin and evolution of meiosis.
 Science 1947 : 105 : 287-89.

A description is given of cell division phenomena in various flagellate genera inhabiting termites or the wood-feeding roach. Various transitional forms between mitosis and meiosis are found. The author attaches special importance to the timing relations between chromosome fission and centromere division.

1085. SWANSON, C. P. 576.353:581.331.23
A consideration of the structure of the prophase chromosomes in the pollen tubes of *Tradescantia*.
 Genetics 1947 : 32 : p. 109. (Abst.).

It has been found that the chromosomes at prophase in the pollen tubes of *Tradescantia* are quadripartite as early as two hours after germination of the pollen grain. The significance of this observation to current theories of chromosome structure and behaviour is discussed.

1086. EIGSTI, O. J. 576.353:581.331.23:576.356.5:578.08
The pollen tube method for making comparisons of differences in mitotic rates between diploids and tetraploids.
 Genetics 1947 : 32 : p. 85. (Abst.).

A method is described by means of which an index of the rate of mitosis can be obtained by a study of pollen tube growth. Fixations are made at 2, 3, 4, 5 and 6 hourly intervals from

the beginning of the experiment. The proportion of one-celled and two-celled pollen tubes forms the basis of comparing mitotic rate. The material studied consisted of *Polygonatum pubescens* ($2n = 20$) and *P. commutatum* ($2n = 40$); the diploid species was found to have a higher rate of mitosis than the tetraploid mutation.

1087. CONGER, A. D.

576.354.46

Duration of prophase as an influence of chiasma frequency.

Genetics 1947 : 32 : p. 83. (Abst.).

The data obtained from smear slides of pollen mother cells of *Tradescantia* spp. showed that, although all the cells of a single anther tend to be at almost the same meiotic stage, the cells of other anthers of the same bud might be comparatively advanced or retarded in meiosis. The conclusion was reached that numbers of pollen mother cells remained in meiotic prophase a longer or shorter time than normal, and that when the prophase is prolonged, more complete pairing is possible, with a resulting higher chiasma frequency, and vice versa.

1088. SAX, K.

576.356:537.531:581.036

Temperature effects on X-ray induced chromosome aberrations.

Genetics 1947 : 32 : 75-78.

Investigations on the effects of temperature on X-ray induced chromosome aberrations in *Tradescantia paludosa* are reported. The effect of temperature on the frequency of aberrations appears to be limited to the period during, or very shortly after, the X-ray treatment.

1089. AUERBACH, C.

576.356.1:576.312.381:581.04

Abnormal segregation after chemical treatment of *Drosophila*.

Genetics 1947 : 32 : 3-7.

As the result of exposing wild type males of *D. melanogaster* to the vapour of N-methyl di-(2-chloroethyl) amine, an abnormal and inherited type of segregation occurred, which points to an effect of the chemical on the centromere of the treated X chromosome.

1090. STERN, C.,

MACKNIGHT, R. H. and

KODANI, M.

576.356.2:575.123:575.17

The phenotypes of homozygotes and hemizygotes of position alleles and of heterozygotes between alleles in normal and translocated positions.

Genetics 1946 : 31 : 598-619.

As the result of experiments on the position effects of the normal allele (+) of the recessive allele *ci* in chromosome IV of *Drosophila melanogaster*, several cases are reported in which the heterozygotes between the two alleles are phenotypically outside the range delimited by the homozygotes, forming an exception to the general rule that the heterozygotes between two alleles are either identical phenotypically, with one of the two homozygotes, or intermediate between them. The possible nature of position effects is discussed.

1091. SPARROW, A. H.

576.356.2:576.354.4:537.531

Changes in sensitivity of chromosomes to X-ray breakage during microsporogenesis.

Genetics 1947 : 32 : 106-07. (Abst.).

Changes in the sensitivity of chromosomes to X-ray induced breakage during microsporogenesis are reported as the result of investigations on *Trillium*. The sensitivity range was found to be large. High and low sensitivity appeared to be associated, respectively, with high and low concentrations of desoxyribose nucleic acid in the chromosomes.

1092. WITKUS, E. R.

576.356.5:575.255

Additional evidence on the role of polyploidy in plant development.

Amer. J. Bot. Suppl. 1946 : 33 : p. 828. (Abst.).

The largest cells normally produced in the periblem of *Mimosa pudica* are tetraploid in contrast to the surrounding diploid tissue.

1093. STOMPS, T. J. 576.356.5:576.353:632
 Over de cytologie der maligne tumoren. (**On the cytology of malignant tumours**).
 Vakbl. Biol. 1944 : 25 : 9-11.

From an examination of the theories and evidence of Boveri, Bauer, Goldschmidt, Winge, Bauch, and other investigators, the writer constructs a hypothesis to explain the possible relationship between cell mutation, polyploidy and cancerous growth.

1094. GEERTS, S. J. 576.356.5:581.04
 Colchicine in het botanisch onderzoek. (**Colchicine in botanical research**).
 Vakbl. Biol. 1944 : 25 : 1-8.

The techniques employed and the plant material used are mentioned, and a critical review of the results of colchicine research in various countries is given under the following heads: c-mitosis, c-tumours, chimaeras, and polyploidy, including various aspects of the artificial induction of polyploid plants. An extensive bibliography is cited.

1095. STEINEGGER, E. and 576.356.5:581.04
 LEVAN, A.
Constitution and c-mitotic activity of iso-colchicine.
 Hereditas, Lund 1947 : 33 : 385-96.

Iso-colchicine displays a c-mitotic activity about 100 times less than that of colchicine. Using Ferguson's concept of thermodynamic activity, it is suggested that the c-mitotic properties of *iso-colchicine* are consequent on its physical properties, while the activity of colchicine must be attributed to its specific chemical constitution.

1096. BERGER, C. A. 576.356.5:581.04:635.25
Cytological effects of combined treatments with colchicine and naphthalene-acetic acid.
 Amer. J. Bot. Suppl. 1946 : 33 : 817-18. (Abst.).

A description is given of the cytological effects of colchicine, naphthalene-acetic acid and these two substances in combination, on the root meristem of *Allium* sp. Colchicine alone induces the formation of diplochromosomes and tetraploid cells in the apical meristem; naphthalene-acetic acid alone stimulates division in the region of elongation. Colchicine treatment following the application of naphthalene-acetic acid gives rise to c-mitosis and polyploid cells in the apical meristem and c-mitosis in the region of elongation. Naphthalene-acetic acid following colchicine gives rise to c-mitosis in the apical meristem and the effects proper to naphthalene-acetic acid in the region of elongation. Treatment involving a mixture of the two reagents produces effects similar to that of colchicine followed by naphthalene-acetic acid.

1097. 576.356.5:581.1
 NOGGLE, G. R. 576.356.5:577.16
The physiology of polyploidy in plants. I. Review of the literature.
 Lloydia, Cincinnati 1946 : 9 : 153-73.

A review is presented of papers published on the effect of polyploidy on plant size, cell size, water content, osmotic pressure, transpiration rate, imbibition capacity, biochemical composition, vitamin, pigment and enzyme content, and composition of the ash.

*BOTANY 58

1098. CICIN, N. 58:006(47)
Moscow's new botanical gardens.
 Soviet News 1947 : No. 1697 : p. 4.

A new botanical garden is being laid out at Moscow under the direction of Academician Cicin. It is intended that this should be the largest and most comprehensive botanical garden in the U.S.S.R., and that it should form an important centre for research on applied botany, evolution and plant breeding.

* General studies, see also individual crops.

1099. KING, J. R. and BROOKS, R. M. 581.162.3:001.4
The terminology of pollination.
 Science 1947 : 105 : 379-80.

A short review is given of the diverse definitions that have been put forward for the terms self, cross, close and open pollination. The desirability for precision in this matter is indicated.

1100. GUSTAFSSON, Å. 581.163
Apomixis in higher plants. Part I. The mechanism of apomixis.
 Acta Univ. Lund 1946 : 57 : Pp. 66.

A useful review is presented of the history of investigations on apomixis, on the terminology, and on the present state of knowledge on this subject. In addition to apomictic phenomena strictly speaking, an account is given of anomalous endosperm development, polyembryony, vegetative reproduction and natural sterility.

1101. JEFFREY, E. C. 581.163:581.162.3
Hormones in relation to reproduction and mutation.
 Amer. J. Bot. Suppl. 1946 : 33 : p. 822. (Abst.).

It is claimed that parthenogenetic development of the ovum of higher plants induced by hormones emanating from pollen deposited on the stigma is far commoner than generally supposed. One result of the hormone stimulus is to cause duplication of the chromosome number of the ovum.

1102. BLAKESLEE, A. F., SATINA, S. and AVERY, A. G. 581.3:575.255
Genetic evidence suggesting that egg cells in *Datura* may sometimes develop from the epidermal layer.
 Amer. J. Bot. Suppl. 1946 : 33 : p. 818. (Abst.).

By pollinating periclinal chromosomal chimaeras of *Datura* sp. in which the chromosome numbers of the epidermis and underlying tissues were in the ratio of $4n : 2n$ or $2n : 4n$ respectively, certain offspring were obtained whose chromosome numbers could be most simply explained on the assumption that the maternal epidermis had contributed the original ovum.

1103. MARTIN, A. C. 581.48:576.12:582
The slighted role of seeds in plant phylogeny.
 Amer. J. Bot. Suppl. 1946 : 33 : p. 842. (Abst.).

It is stated that the internal structure of seeds affords a valuable insight into the course of angiosperm phylogeny. Twelve fundamental forms of seed development are recognized. Classification based on these forms cuts across the present systems founded principally on floral morphology.

1104. MONTEIRO FILHO, H. 582
A nova sistemática. (The new systematics).
 Rodriguésia, Rio de J. 1942 : 6 : No. 15 : 45-52.

A review is presented of the ways in which the "new systematics" differs from classical taxonomy.

1105. SVENSON, H. K. 582:001.4
The Linnaean concept of species.
 Amer. J. Bot. Suppl. 1946 : 33 : p. 843. (Abst.).

It is pointed out that Linnaeus' binomials are keys to the polynomial specific names which actually define his species.

1106.

63.00.15(48.5)

Berättelse över Jordbrukets forskningsråds verksamhet under budget-året 1945/46. (**Report on the work of the Agricultural Research Council during the financial year 1945-46**).

K. LantbrAkad. Tidskr. 1946 : 85 : 477-84.

This council was appointed in 1945 in Sweden to develop agricultural research and to establish and maintain contact with the National Technical Research Council and various investigators and bodies engaged in such work. Many meetings have been held.

GENERAL AGRONOMY 631

1107.

PAAUW, F. VAN DER

631.421:58

Agronomie en botanie. (**Agronomy and botany**).

Vakbl. Biol. 1943 : 24 : 107-16.

This is a paper dealing with the difference in the type of problem that arises in agronomy and botany, and also the different techniques used in these two branches of science.

1108.

HELLBO, E.

631.521.5:633(48.5)

Fältkontrollen och dess betydelse. (**Field control work and its importance**).

Årsb. Jordbruksforskning, Stockholm 1946 : 166-72.

The Government Central Seed Control Institute in Sweden is the only body in the country to conduct official field trials; the object of these is to ensure (1) that seed produced by breeders or growers is authentic, pure and disease-free; and (2) that proper methods of seed growing and seed trading are adopted. The value of seed control work in preventing inadvertent or wilful adulteration of seed lots delivered to farmers is exemplified.

The control and the advisory aspects of field control are also discussed together with the three forms of control more recently evolved for seed potatoes, vegetables, and for examining the table quality of potatoes for domestic use.

*DISEASES AND INJURIES, BACTERIA, FUNGI 632

1109.

SNEEP, J.

632:577.17:576.16

De biochemie van het parasitisme. (**The biochemistry of parasitism**).

Tijdschr. PlZiekt. 1946 : 52 : 125-37.

In this discussion, the different types of parasitism and the problems of specialization and physiological races are considered from their biochemical aspects, and with special reference to the role of growth substances in the development of fungi.

The author's conclusion is that the plant has a complete metabolic system, whereas the parasite has an incomplete one, which, by parasitism, is completed by growth substances derived from the host plant. The metabolic system of the plant is also influenced by the pathogen. A similar "lock and key" principle is postulated in regard to specialization.

Authors are cited throughout.

1110.

WEBER, A.

632:578.08(48.9)

Hvem er interesseret i at købe Farvefotografier af Plantesygdomme? (**Who is interested in buying coloured photographs of plant diseases?**)

Nord. JordbrForskn. 1943 : Nos. 5-6 : 273-74.

An offer is made by the Danish Phytopathological Research Department (Statens plante-pathologiske Forsøg) of inexpensive duplicates of coloured photographs of plant diseases and pests photographed or to be photographed.

1111.

BRAUN, W.

632.3:575.24

Some recent results of studies on bacterial variation.

Genetics 1947 : 32 : p. 80. (Abst.).

Evidence has been obtained in support of the view that the so-called "microbic dissociation", distinguished by an apparently orderly succession of variant types and the occurrence of

* General studies, see also individual crops.

linked variation, should not be regarded as different from other types of discontinuous variation in bacteria. Apparently successive changes have been shown to be due to the successive establishment of mutants with inherently different growth rates or viability.

1112. LURIA, S. E. 632.3:575.24
Non-independent mutations in bacteria.
 Genetics 1947 : 32 : p. 95. (Abst.).

A number of complex mutations are reported in *Escherichia coli* causing resistance to several bacteriophages, resistance to each of which is produced independently by other mutations.

1113. HERSHEY, A. D. 632.3:575.242:575.11
Mutation of bacteriophage with respect to type of plaque.
 Genetics 1946 : 31 : 620-40.

Mutants of bacteriophages acting on *Escherichia coli* are reported. These differed from the parent wild form of phage in plaque type, and in causing prompt rather than inhibited lysis in highly concentrated culture, but otherwise were identical with the parent type in growth characteristics, host range and antigenic specificity. The frequency of the mutation of the wild type 1 (r^+) to r strains was approximately 10^{-3} or 10^{-4} . Evidence of true back mutation of r strains to the wild type was obtained, indicating that the mutation to r corresponds to a true allelic modification in gene structure. Mutation affecting host range occurred at the same rate in $r + r^+$ stocks, pointing to the existence of at least two independent genetic factors. Antigenic specificity also appeared to be a character inherited independently of host specificity and mutation to r . The analogy commonly drawn between viruses and genes is examined in the light of these results.

1114. VLOTEN, H. VAN 632.3:576.16:633
 Is verrijking van de mycoflora mogelijk? (Naar aanleiding van de populierenroest). [Is enrichment of the mycoflora possible? (In relation to poplar rust)].
 Tijdschr. PlZiekt. 1944 : 50 : 49-62.

Enrichment of the microflora can only occur by the introduction of new forms of fungi from abroad, by hybridization or by mutation. Among the instances of such processes described are : (1) the occurrence of several new physiological races and one white variant of *Melampsora Larici-populina* Klebahn; and (2) the appearance of new races of *Phytophthora infestans* de Bary and of *Synchytrium endobioticum* (Schilb.) Perc. in breeding for blight and wart resistant potatoes. In the latter case, it is suggested that the fungus may not have been actually a new form but so rare that its isolation was practically impossible. The well known method of identifying such races by test collections of special varieties of the host plants is mentioned, with a comment on its scope in any attempt to identify all existing forms of a particular fungus.

The situation in Holland as regards poplar rust *M. Larici-populina* Kleb. is described in detail. The appearance of various races of the fungus is supposed to be due to larches having been interplanted in a poplar experimental plot with consequent hybridization occurring on the larches on which *M. Larici-populina* forms its caeomata.

1115. BURKHOLDER, P. R. and GILES, N. H. (jun.) 632.3:581.192:535.61-31:575.243
Production of biochemical mutants in *Bacillus subtilis* by means of ultra-violet radiation.
 Amer. J. Bot. Suppl. 1946 : 33 : p. 829. (Abst.).

Mutants deficient in the power to synthesize one or other of the following substances have been induced by ultra-violet irradiation: arginine, cystine, histidine, leucine, methionine, threonine, tryptophane, riboflavin, guanine and uracil.

1116. HOLLAEENDER, A.,
SWANSON, C. P. and
POSNER, I. 632.4:535.61-31:575.243
The sun as a source of mutation producing radiation.
Amer. J. Bot. Suppl. 1946 : 33 : p. 830. (Abst.).
The ultra-violet radiation of sunlight has been shown to induce mutations at a rather low rate in *Aspergillus terreus* and *Trichophyton mentographytes*.
1117. SWANSON, C. P. and 632.4:535.61-31:575.243
HOLLAEENDER, A. 632.4:535.61-15:575.243
Modification of the ultraviolet mutation rate by pretreatment with near infrared.
Amer. J. Bot. Suppl. 1946 : 33 : p. 832. (Abst.).
Pre-treatment with infra-red light depresses the mutation rate induced in fungous spores by low energy ultra-violet light, but increases the mutation rate induced by high energy ultra-violet light.
1118. 632.421.2:581.192:537.531:575.243
BONNER, D. 632.421.2:581.192:535.61-31:575.243
Production of biochemical mutations in *Penicillium*.
Amer. J. Bot. 1946 : 33 : 788-91.
Biochemical mutation in *P. notatum* and *P. chrysogenum* has been induced by means of irradiation with X-rays or ultra-violet light. Mutants were obtained deficient in the power to synthesize one or other of the following substances: biotin, choline, inositol, nicotinic acid, *p*-aminobenzoic acid, pyridoxin, thiamin, yeast nucleic acid, arginine, proline, cystine or methionine, histidine, isoleucine, leucine, lysine, phenylalanine and tryptophane. In addition, some of the mutants were unable to reduce nitrate; others required substances as yet unidentified.
It proved possible to infer the stages in biochemical synthesis of some of the cellular components of the two species.
1119. CHILTON, S. J. P. and
WHEELER, H. E. 632.421.9:575.242:575.11
Studies on the nature of "segregation" in certain plus strains of *Glomerella*.
Phytopathology 1947 : 37 : p. 4. (Abst.).
The production of minus strains by mutation from ascospores isolated from perithecial and non-conidial plus strains of *Glomerella* is reported. Analyses of the asci gave ratios of 8 plus, 4 plus and 4 minus, or 8 minus cultures. Crosses between these strains indicated that the strains were genetically different from the plus parental strain.
1120. LUCAS, G. B. 632.421.9:576.35
Genetics of *Glomerella*. IV. Nuclear phenomena in the ascus.
Amer. J. Bot. 1946 : 33 : 802-06.
A description is given of nuclear behaviour in the ascus of several strains of *Glomerella* sp. There appear to be $n = 4$ chromosomes. Fusion of two haploid nuclei occurs in the young ascus, and this is followed by reduction division and a further meiotic division to give eight haploid ascospore nuclei.
1121. FRIES, N. 632.421.9:581.192:537.531:575.243
Mutant strains of *Ophiostoma multiannulatum* requiring components of different nucleotides.
Ark. Bot. 1947 : 33 : No. 3 : 1-7.
Four groups of mutant strains of *O. multiannulatum* have been obtained by means of X-irradiation. The first group required for its growth uracil, cytidine or cytidylic acid; the second required adenine, adenosine or adenylic acid; the third required hypoxanthine, adenine, adenosine or adenylic acid; while the fourth required guanine or guanosine.

1122. FRIES, N. and TROLLE, U. 632.421.9:581.192:575.114
Combination experiments with mutant strains of *Ophiostoma multiannullatum*.
 Hereditas, Lund 1947 : 33 : 377-84.

Illegitimate combinations of plus and minus strains of biochemical mutants of *O. multiannullatum* are reported. From combinations of strains deficient in capacity to synthesize different substances, wild type mycelia were obtained.

1123. LILLY, V. G. and BARNETT, H. L. 632.472.3:581.192:575.1
The inheritance of partial thiamin deficiency in *Lenzites trabea* (Pers.) Fries.

Amer. J. Bot. Suppl. 1946 : 33 : p. 831. (Abst.).

Different strains of *L. trabea* differ in their thiamin requirements. The differences appear to be heritable although not according to a simple Mendelian scheme.

1124. ALTENBURG, E. 632.8:576.12
Tumour formation in relation to the origin of viruses.
 Amer. Nat. 1947 : 81 : 72-76.

Amplifying further his viroid theory (cf. *Plant Breeding Abstracts*, Vol. XVII, Abst. 631), the author suggests that tumour inducing viroids might well form an intermediate link in the evolution of viroids to transmissible viruses. The mutation of a single viroid to a virus is thought to have little chance of establishing itself in an undividing cell, yet, should the virus at the same time induce cell division, then the virus itself would have an opportunity for multiplying.

1125. HANSEN, H. P. 632.8:576.16:578.08:633.71
 Orienterende Undersøgelser over nogle Tobaks- og Tomatviroser i Danmark. (**Preliminary investigations of some viruses of tobacco and tomatoes in Denmark**).
 Nord. JordbrForskn. 1943 : Nos 5-6 : 264-72.

This paper deals with the identity of a number of viruses.

Viruses cannot be identified with certainty solely by their symptoms on a tobacco plant. A simple method of infection is described.

1126. MASTENBROEK, C. 632.8:576.16:633.367
 Enkele veldwaarnemingen over virusziekten van lupine en een onderzoek over haar mozaiekziekte. (**Some field observations on virus diseases of the lupin, and an investigation on its mosaic diseases**).
 Tijdschr. PlZiekt. 1942 : 48 : 97-118.

Previous work on the subject is reviewed.

The symptoms, host range and physical characteristics observed in a study of yellow sweet lupin, infected with mosaic, indicated that the pathogen, for which the name *Lupinus virus 1* has been suggested, is new to the literature of the subject.

Incidentally the virus reactions of other species of different genera are recorded.

From the investigation of a similar malady of *Lupinus albus*, it would appear that the mosaic viruses of the yellow and the white lupin are not identical.

1127. KOPPEL, C. VAN DE 632.951.1:575.42(81)
Lonchocarpus-wortel (cubé of timbo), een waardevol insecticide uit het Amazonegebied, vergeleken met den *Derris*-wortel van Zuidoost-Azië. [***Lonchocarpus* root (cubé or timbo), a useful insecticide from the Amazon region, compared with the *Derris* root of S.E. Asia**].

Landbouwk. Tijdschr. 1943 : 55 : 63-73.

The value of different species of *Lonchocarpus* and of *Derris* as insecticides is compared. *L. utilis* may yield a product with a higher rotenone content than high grade varieties of *Derris*, such as Toeba Woelong and Changi No. 3, but requires three and a half years to

reach a high level of output. *Derris*, however, requires only two years, and, with a variety like Sarawak Creeping, surpasses within that time the output from cubé.

Lonchocarpus selection would have to start from the beginning. Great variation in rotenone content has been found in *L. utilis* in Peru and in numerous clones under observation in Puerto Rico. Possible future developments in cultivation and selection of *Lonchocarpus* should at least be kept in mind by *Derris* producers of south-eastern Asia.

1128. HANSBERRY, R.,
CLAUSEN, R. T. and
NORTON, L. B. 632.951.1:581.192
Variations in the chemical composition and insecticidal properties of the yam bean (*Pachyrrhizus*).
J. Agric. Res. 1947 : 74 : 55-64.

Samples of *Pachyrrhizus* spp. collected in Mexico, Guatemala and El Salvador, were subjected to chemical analysis and tested for their insecticidal value. Significant correlations were found between toxicity and resin content, rotenone content, and three colorimetric analytical values. Morphological variation and geographical origin were not found to have any effect upon chemical composition or toxicity.

1129. HERMANN, F. J. 632.951.1:582
The Amazonian varieties of *Lonchocarpus nicou*, a rotenone-yielding plant.
J. Wash. Acad. Sci. 1947 : 37 : 111-13.

In view of the intergradations between the *Lonchocarpus* species described from Colombia, it is recommended that *Lonchocarpus* No. 10 of Krukoff and Smith, *L. Urucu* Killip et Smith and *L. utilis* A. C. Smith should all be regarded as varieties of the polymorphic species *L. Nicou* (Aubl.) DC.

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1130. 633:575.125(73)
More hybrids are coming.
Sth. Seedsman 1947 : 10 : No. 2 : p. 13.

The most recent developments in the utilization of F_1 hybrids in several crops are briefly discussed.

1131. RUDORF, W. 633:575.127.2
A importância da hibridação intra- e inter-genérica no melhoramento das plantas cultivadas. (**The importance of intragenetic and intergeneric hybridization in the improvement of cultivated plants**).
Agron. Lusitana 1944 : 6 : 333-47.

An outline is given of the useful results that have been obtained by interspecific hybridization of barley, rye, *Medicago*, *Brassica*, *Lycopersicon*, *Solanum*, *Malus* and *Ribes*, and by crossing wheat and rye.

1132. PEDERSEN, A. 633-1.531.12:575.12
Krydsningsfaren i Frøavlén. (**The danger of crossing in seed growing**).
Nord. JordbrForskn. 1943 : Nos 5-6 : 182-96.

The subject is treated under the following heads: what forms may cross; the fertility of the hybrids; sources of contamination; frequency of crossing; anemophily and insect pollination; and measures against crossing, including spacing regulations in Denmark and other countries, and their observance.

In the ensuing discussion, legal aspects were discussed.

CEREALS 633.1

1133. GRAIFF, G. L. 633.1(61.2)
Contributo alla cerealicoltura libica. (**Contribution to cereal culture in Libya**).
Agricoltura Libica 1941 : 10 : 1-24.

Several varieties of wheat and one oat variety and their behaviour under the conditions of cultivation in Libya are described. R. M. I.

1134. FRÖIER, K. 633.1:575(42)
 Växtförädling av stråsäd i Tyskland och England under andra världskriget. (**Breeding of straw cereals in Germany and England during the Second World War**). 633.1:575(43)
 Årsb. Jordbruksforskning, Stockholm 1946 : 112-21.

A summary from the sources available in Sweden is given of the work done in Germany and England. The original articles have already been reviewed in *Plant Breeding Abstracts*.

1135. BAYLES, B. B. 633.1:575:35
Technical cooperation in small grain improvement.
 J. Amer. Soc. Agron. 1947 : 39 : 207-13.

The organization of cereal breeding in the U.S.A. is outlined, special emphasis being laid on the value of co-operative planned research.

1136. CIFERRI, R. 633.1-1.524:582
 Osservazioni ecologico-agrarie e sistematiche su piante coltivate in Etiopia. (**Ecologo-agrarian and systematic observations on plants cultivated in Ethiopia**).
 Atti Ist. Bot. e Lab. Crittogamico, Univ. Pavia 1944 : 2 : Ser. 5 : 121-232.

On the basis of a study of the published data of Russian and other botanists and of his own collections, the author examines the relationships between the wild and cultivated flora of Ethiopia and that of the neighbouring continents and the intermediate zones such as Yemen, Socotra, etc. For some plants, Abyssinia is a primary centre of origin; these include *Eragrostis Teff* and *Guizotia abyssinica*. For others it forms an important part of the primary centre, for instance for many millets and sorghums, coffee and certain *Gossypium* spp., and for a large group of other plants it is an important secondary centre.

A botanical description is given of *Guizotia abyssinica* and certain related species, cultivated for oil production. The characteristics of some of the plants found indicate them to be interspecific hybrids, and spontaneous hybridization with wild forms is very frequent. A tentative classification of the main forms is presented.

Similar classifications and descriptions are given of the Abyssinian forms of flax, oats, sorghums, teff (*Eragrostis Teff*), millets, barley and wheat.

Interesting types occur among almost all these crops; the wheats for instance contain one of the earliest maturing groups of *Triticum dicoccum* in the world, growing at high altitudes, up to 3000 metres and more. The author is on the whole in favour of Flaksberger's later system, where the Abyssinian forms of *T. durum* and *T. turgidum* are placed together in a separate species *T. abyssinicum*. It is pointed out however that this does not overcome the difficulty of distinguishing between the *durum* and *turgidum* types, since these are retained as subspecies. Many intermediate forms exist and some at least are thought to be hybrids. One such plant for instance gave a progeny containing eight plants resembling *T. durum*, three resembling *T. turgidum*, and five with intermediate characters; and plants resembling both *T. durum* and *T. turgidum* appeared in the F_2 progenies obtained from all three groups. A great number of intermediate and apparently hybrid forms were observed also in the barleys, the millets and particularly the sorghums, central Abyssinia being characterized by an exceptional wealth of forms, many of them endemic.

1137. LENGLEN. 633.1-1.557:581.162.32:9
 La fécondation artificielle des céréales: le procédé Hooibrenck. (**Artificial fertilization of cereals. Hooibrenck's method**).
 C.R. Acad. Agric. Fr. 1943 : 29 : 326-33.

A critical account is given of the theories of Hooibrenck, a Dutch agriculturist born in 1813, and of the controversy that arose about them in France in the latter half of the nineteenth century. Hooibrenck believed that artificial fertilization should increase the yield of cereals, and he proposed a method which he thought would bring this about. He also considered that cross-pollination in cereals should give higher yields than selfing. Comments follow by Schribaux and Boeuf.

1138.

POHJAKALLIO, O.

633.1-2.112-1.521.6(48.5)

633.2/3-2.112-1.521.6(48.5)

Frågan om växternas motståndskraft mot torrperioder i Finland.
(The question of the resistance of plants to drought periods in Finland).

Nord. JordbrForskn. 1945 : Nos. 5-6 : 206-26.

For the climate of Finland, drought resistant crop plants are of practical value only if they are also not too sensitive to marked humidity. The difficulties of breeding such crop plants with yields of good quality are demonstrated by a detailed analysis of the physiological basis of hardening.

The respective roles of root depth, developmental rhythm in relation to the incidence of drought periods, and the ability of the plant to use the subsoil water are examined in relation to drought resistance, in the light of experiments with cereals and herbage plants at the Plant Breeding Division of the Agricultural Research Institute, Jokioinen.

In addition to the detailed findings, it is of interest to note that (1) wilting and yellowing of the leaf in wheats is not suitable as a criterion of drought resistance; and (2) a new method has been used in pot experiments to determine the role of the root in the resistance of herbage plants to drought periods.

The results showed that timothy grass had shorter roots than the other herbage plants in the experiment, a finding supported by previous experiments with timothy strains; breeding for greater root length is suggested. Similarly, differences in depth of penetration of the root were found in oat varieties.

In general, small seeded herbage plants appear to be most sensitive to drought in their germinating stage, and cereals, if yield of seed is the criterion, most sensitive at the shooting stage of the ear or panicle. In addition to specific and varietal differences in resistance to drought periods, different parts of the plant may react differently.

In breeding for drought resistance in cereals, varieties should be crossed whose resistance is due to different causes. A cross of this kind between the oats Klock III and Guldregn II, at the Plant Breeding Division at Jokioinen, has produced a hybrid population with an average yield of 75.2% as compared with Klock III, but containing individuals with particularly good yields in spite of the thin layer of top soil allowed in the experiment. Among the latter plants, which appear to have deep roots, it is hoped to find lines with an even better developmental rhythm than Guldregn II and superior to Klock III in drought resistance and the ability to utilize the water of the subsoil.

In timothy breeding, attention has been mainly directed to rapidity of development of the young shoots, a feature very easy to identify by visual inspection in the plot.

1139. VALLEGA, J.

633.1-2.452:576.16:631.521.6

Aspectos de la lucha contra las royas. (Aspects of the struggle against the rusts).

Rev. Fac. Agron. Univ. Montevideo 1943 : No. 34 : 9-35.

A review is presented of the general problem of combatting infection of crop plants by rusts. Special attention is paid to cereal rusts, physiological specialization of the pathogens and varietal differences in susceptibility of the hosts.

1140. GUYOT, A: L.,

MASSENOT, M. and

633.1-2.452:576.16:631.521.6(44)

SACCAS, A.

633.2-2.452:576.16:631.521.6(44)

Etudes expérimentales sur les rouilles des graminées et des céréales en 1944. (Experimental studies on the rusts of grasses and cereals in 1944).

Ann. Ec. Agric. Grignon 1945-1946 (1946) : 5 : Sér. 3 : 33-81.

Extensive details are given of the varietal reaction at Grignon of wheat, oats, barley, rye, *Aegilops ovata*, *Arrhenatherum* spp., *Elymus canadensis*, *Lagurus ovatus*, *Lolium linicola* and *Trisetum flavescens* to various local races of *Puccinia graminis*, also to *P. triticina*, *P. glumarum* and *P. coronata*.

1141. GUYOT, A. L.,
 MASSENOT, M. and 633.1-2.452:576.16:631.521.6(44)
 SACCAS, A. 633.2-2.452:576.16:631.521.6(44)
 Etudes expérimentales sur les rouilles des graminées et des céréales en
 1945. (**Experimental studies on the rusts of grasses and cereals
 in 1945**).

Ann. Ec. Agric. Grignon 1945-1946 (1946) : 5 : Sér. 3 : 213-66.

Extensive details are given of the varietal reaction at Grignon of wheat, oats, barley, rye, *Aegilops crassa*, *Agropyron* spp., *Agrostis alba*, *Anthoxanthum odoratum*, *Arrhenatherum elatius*, *Bromus* spp., *Dactylis glomerata*, *Elymus canadensis*, *Festuca arundinacea*, *Lolium* spp., *Poa trivialis* and *Vulpia Myuros* to various local races of *Puccinia graminis*, also to *P. triticea*, *P. glumarum* and *P. coronata*.

1142. GUYOT, A. L.,
 MASSENOT, M. and 633.1-2.452:576.16:631.521.6:582
 SACCAS, A. 633.2-2.452:576.16:631.521.6:582
 Considérations morphologiques et biologiques sur l'espèce *Puccinia
 graminis* Pers. sensu lato. (**Morphological and biological con-
 siderations on the species *P. graminis* Pers. sensu lato**).
 Ann. Ec. Agric. Grignon 1945-1946 (1946) : 5 : Sér. 3 : 82-146.

A detailed biometric study of a wide range of uredospore and teleutospore samples of black rust collected from many different cereal and grass genera has led the authors to propose the following intraspecific classification of *P. graminis*: (1) subsp. *minor*; (2) subsp. *media*, including varieties *Erikssoni*, *Calamagrostidis*, *Lolii* and *Vulpiae*; and (3) subsp. *major*, including varieties *Stakmani*, *Triticici* and *Elymi*.

1143. SPANGENBERG, J. 633.1.00.14(89)
 633.52.00.14(89)
 El trigo "Klein 157" en el Uruguay. (**The wheat Klein 157 in
 Uruguay**).
 Rev. Fac. Agron. Univ. Montevideo 1943 : No. 32 : 73-102.

This article is principally devoted to a description of the behaviour of the variety Klein 157 in Uruguay, but also includes reports of varietal trials of wheat, oats, barley, flax and a few other crops.

WHEAT 633.11

1144. Nuove razze di grano. (**New races of wheat**).
 Terra e Sole, Roma 1946 : No. 22 : Pp. 2. 633.11:575(45)

New winter wheat varieties produced by the Bologna Plant Breeding Institute are described. Fulvo is one of the few early maturing varieties possessed of resistance to cold and is therefore suitable for highland areas; it is also resistant to rust and lodging and has grain of good quality.

Florio is a high yielding wheat for highland areas. Falcone is a variety of high quality, resistant to lodging and suitable for the plains, where it yields up to 60 quintals per hectare. Fiorello is a recent hybrid of Damiano x Cologne 188; it is early, highly resistant to rust and lodging, and has long grains of high quality.

Two further varieties produced by the seed firm Produttori Sementi at Bologna are mentioned, namely S. Michele, combining resistance to lodging, cold and rust and high yielding capacity in mountain zones, and S. Luca, which gives exceptionally high yields in areas where there is no fear of lodging.

1145. DELLAZOPPA, J. G. 633.11:575(89)
 Aspectos fundamentales de los trabajos fitogenéticos realizados en "La
 Estanzuela". (**Fundamental aspects of the plant breeding work
 accomplished at La Estanzuela**).

Rev. Fac. Agron. Univ. Montevideo 1943 : No. 34 : 37-50.

In this review of the plant breeding achievements of the La Estanzuela Experimental Station, the author describes the work done there on introducing and selecting new wheat

varieties, and on producing wheats with an extended sowing season, superior milling and baking quality and rust resistance. Descriptions follow of some of the more important wheat varieties raised at La Estanzuela.

1146. WIKLUND, K. 633.11:575"793"(48.5)
633.11.00.14(48.5)
Vårveteodlingen i södra Norrland. (The growing of spring wheat
in southern Norrland).

Sverig. Utsädesfören. Tidskr. 1947 : 57 : 62-69.

Results of variety trials at the Ångermanland branch station of the Swedish Seed Association in 1936-45 are given, mention being made of the Finnish varieties, Sopu, Valamo and Pika II, and the Steinitzer awned spring wheat bred by Tschermak in Vienna, as well as well known Swedish wheats.

The aims in breeding a suitable spring wheat for Norrland are earliness and improved yield and stiffness of straw.

1147. MIÈGE, E. 633.11:575.127.5:633.11*Aegilops*:664.641.016
L'hérédité de la composition chimique chez les hybrides intergénériques.
(The heredity of chemical composition in intergeneric hybrids).
Scientia Genetica 1940 : 2 : 82-91.

Descriptions are given of the F_1 to F_5 generations of crosses of *Aegilops ovata* L. x *Triticum vulgare* and *Ae. ovata* L. x *T. durum* Desf. The segregation was more pronounced in the former cross than the latter. A gradual reversion to the type of one or other of the parent genera was observed, but certain intermediate types remained. These were characterized by varying numbers of bivalents, especially in the cross with *T. durum*, which was cytologically more irregular than the other. The hybrids of the *Aegilops* type were mainly sterile, those of the *Triticum* type more fertile.

Chemical analysis showed that *Aegilops* is higher in ash, nitrogen and oil content and lower in starch. The hybrids of all generations studied were closer to the *Aegilops* than the *Triticum* parent; this was specially evident in the hybrids with *T. durum*. Figures for phosphorus content in all cases went parallel with those for nitrogen.

As regards baking quality, the Pelshenke index was 105 in *Ae. ovata* and 103 in the *T. vulgare* parent, whereas with the *T. durum* parent it was much lower, namely 89. Transgression occurred in this character in the cross *Ae. ovata* x *T. durum*, the value for one of the intermediate hybrids being 127, and for one of the hybrids of the *T. durum* type 151.

1148. O'MARA, J. G. 633.11:575.127.5:633.14:576.356.4
The substitution of a specific *Secale cereale* chromosome for a
specific *Triticum vulgare* chromosome.
Genetics 1947 : 32 : 99-100. (Abst.).

From slightly asynaptic plants of *T. vulgare*, in which a bivalent from *S. cereale* had been added to the normal 21 bivalents, individuals were obtained which were monosomic for one chromosome of *Triticum* and one chromosome of *Secale*. The speltoid characteristics of certain of these plants indicated that chromosome IX was the chromosome of *T. vulgare* involved.

By selfing these plants, a plant with 20 bivalents from *Triticum* and one from *Secale* was secured, which was therefore nullisomic for chromosome IX of *T. vulgare*, and disomic for the *Secale* chromosome. The identity of the *Triticum* chromosome was verified by synthesizing the double monosomic from a gamete nullisomic for chromosome IX and a gamete monosomic for chromosome IX and the *Secale* chromosome. The double monosomic thus obtained was indistinguishable from the speltoid plants previously produced by selfing the slightly asynaptic plants with 22 bivalents.

Addition of the *Secale* bivalent to plants nullisomic for chromosome IX restores male fertility and normal plant vigour, and greatly increases female fertility. The addition of the *Secale* bivalent to normal plants of *T. vulgare* results in the production of semi-dwarf and partially female sterile plants.

1149. DUSSEAU, A. 633.11:575.242:576.356
Blé dur issu du croisement de deux tendres italiens. (**Hard wheat obtained from crossing two Italian soft wheats**).
Scientia Genetica 1940 : 2 : 79-81.

In a cross between two varieties of *Triticum vulgare*, Padova x Inallettibile 38, certain forms resembling *T. durum* appeared. A study of sporogenesis, and root tip examination of an F_{II} plant, showed it to have $2n = 28$ chromosomes.

1150. CÂMARA, A. 633.11:576.312.34
Cromosomas dos trigos hexaplóides. (**Chromosomes of the hexaploid wheats**).
Agron. Lusitana 1944 : 6 : 221-51.

Ideograms have been constructed from measurements of the chromosomes of *Triticum vulgare*, *T. compactum* and *T. Spelta*. In each case, three chromosomes with secondary constrictions were present, but the three species were so similar cytologically that no conclusions on their phylogenetic relations could be inferred from the cytological data. Tentative allocation of the chromosomes to the A, B and C genomes was made.

1151. SMITH, L. 633.11:576.356.2:537.531:575.116.1
Chromosomal fragments in diploid wheat and their usefulness in genetic studies.
Genetics 1947 : 32 : p. 105. (Abst.).

A secondary trisome was obtained in wheat by the reduplication of a chromosome fragment, which is presumed to have arisen as the result of an X-ray induced breakage. Plants with fragments were morphologically distinguishable, and fairly fertile. The fragments are rarely transmitted through the male parent, and have a marked effect upon the transmission of the genes in one linkage group. The author suggests that an interchange between one of the fragments and a normal non-homologous chromosome would bring about the association of genes in a second linkage group with the transmission of the fragments, and would thus make it possible to determine whether an untreated gene was present in either of the linkage groups in question. It is suggested that stocks of diploid wheat with five such interchanges, each involving a different chromosome, would enable a test of each of the seven chromosomes to be carried out.

1152. SEARS, E. R. 633.11:576.356.4:575.127.2
The sphaerococcum gene in wheat.
Genetics 1947 : 32 : 102-03. (Abst.).

The behaviour of the gene or closely linked group of genes which distinguishes *Triticum sphaerococcum* from *T. vulgare* was investigated in crosses of the former species with 17 different nullisomics of the Chinese Spring variety of *T. vulgare*. No plants of the *T. sphaerococcum* type were obtained in the F_1 , although the gene distinguishing this species would have been in the hemizygous condition in one of the F_1 progeny if located on any of the missing 17 chromosomes. In one of the F_2 generation carrying chromosome XVI of the D or C genome, *T. sphaerococcum* types were segregated, depending upon chromosome number. Disomics possessed the characters of *T. sphaerococcum*, whereas the monosomic plants were of the *T. vulgare* type.

The author suggests that the gene determining the characters of *T. sphaerococcum* is located on chromosome XVI; and that in double dose it produces the *T. sphaerococcum* type, but in single dose is relatively without effect. It is pointed out that a similar dosage relationship is also shown by the gene for the squarehead type located on chromosome IX. The presence of chromosome XVI of *T. vulgare* increases, rather than decreases, the length of culm and spike; it is not known whether this effect is due to an allele of the *T. sphaerococcum* gene or to other factors located on the same chromosome.

1153.

CALDWELL, R. M. and
COMPTON, L. E.633.11:581.46:575.11.061.6
633.11-2.421.1-1.521.6:575.11
633.11-2.452:576.16:631.521.6:575.11**Correlated inheritance of resistance to eight races of wheat leaf rust, *Puccinia rubigovera tritici*, powdery mildew, *Erysiphe graminis tritici*, and glume color.**

Phytopathology 1947 : 37 : p. 4. (Abst.).

The inheritance of resistance to leaf rust races 9, 31, 65, 78, 79, 80, 101 and 110, and to powdery mildew was studied in the F_3 and F_4 progenies of the cross Wabash x Michigan Amber.

The reaction to rust was determined on the first leaf of the seedling, and the reaction to mildew on the third and fourth leaves. The first leaf of Wabash showed either resistance or an "X" reaction to each of the eight leaf rust races; the "X" reaction usually changed to resistance in the second and third leaves. Michigan Amber exhibited resistance to the two cultures of powdery mildew used. Wabash has white plumes, Michigan Amber brown. The segregation data indicated that susceptibility to leaf rust is a simple dominant character. The resistant or "X" type of reaction to all eight races appears to be conditioned by the same gene. Powdery mildew resistance and brown chaff colour each appear to be dominant characters determined by a single factor. Leaf rust and powdery mildew resistance and chaff colour were found to be independently inherited.

1154.

PEREIRA, A.

633.11:581.6(46.9)

Proteínas do trigo. I—Contribuição para o estudo da variação da proteína e gluten segundo a variedade e a região. (Proteins of wheat. I—Contribution to the study of the variation of protein and gluten according to variety and locality).

Agron. Lusitana 1944 : 6 : 367-96.

The protein and gluten content has been ascertained of the following wheat varieties, grown at various localities in Portugal: Quaderna, Barbela, Galego Barbado, Rieti, Ardito, Mentana, Magueija, Frassineto, Da Maia, Precoco, Virgílio, Littório and Verdeal Rijo.

1155.

CIFERRI, R. and

GIGLIOLI, R. G.

633.11-1.524(49.9)

I frumenti dell'isola di Rodi. (The wheats of the island of Rhodes).

Ital. Agric. 1940 : 77 : 767-70.

A study of the number of species and varieties in cultivation in the island in 1938 showed the wheat to be more uniform than in 1932 when studied by Schreiber. The two principal varieties however were still *Triticum durum* var. *leuicurum* and *T. vulgare* var. *graecum*. The custom of mixed cultivation in the past has led to the presence of a certain number of interspecific hybrids. The wheats of Rhodes are markedly resistant to lodging but susceptible to rusts; in general they resemble the Mediterranean type more than the Anatolian type. Agriculturally they are inferior in every respect to the new wheat varieties produced by plant breeders and should be replaced by them.

1156.

CIFERRI, R. and

GARAVINI, M.

633.11-1.524(61.2)

La cerealicoltura in Africa Orientale. VII.—I frumenti oasici della Libia in rapporto a quelli etiopici. (Cereal cultivation in East Africa. VII. The wheats of the Libyan oases in relation to those of Ethiopia).

Ital. Agric. 1940 : 77 : 409-15.

Continuing previous studies of the cereals of East Africa (cf. *Plant Breeding Abstracts*, Vol. IX, Absts 1428 and 1447 and Vol. X, Absts 373, 401, 738 and 772), special research was carried out with wheats growing in the Libyan oases, 83% of which were found to comprise *Triticum vulgare* varieties. Though adventive, they are regarded as being not of recent introduction and possess certain characters of interest for breeding; for instance they have an exceptionally large number of grains per spikelet and per ear.

1157. CIFERRI, R. 633.11-2-1.521.6(45)
 Relazione sull' attività del Laboratorio Crittogamico, dell' Osservatorio Fitopatologico e del Centro Studi sugli Anticrittogamici durante gli anni 1944 e 1945. (**Report on the activities of the Cryptogamic Laboratory, the Phytopathological Observatory and the Centre of Studies on Anticryptogamic Substances for 1944 and 1945**).

Atti Ist. Bot. e Lab. Crittogamico, Univ. Pavia 1946 : 5 : Ser. 5 : 277-321.

On the basis of data received from the inspectors of agriculture in the different districts, it has been possible to assess the wheat varieties cultivated in Italy with regard to their resistance to the chief causes of injury, namely lodging, frost, autumn rain, drought and high temperature at ripening time. In northern Italy, the most resistant variety in the plains and the lower hills was San Giorgio, followed by Tevere and Villa Glori; in the mountain zone, Villa Glori was the best, followed by Damiano Chiesa, Roma and Mentana. In central Italy, Roma and Virgilio were the best, followed by Frassineto 405 in the plains and Littorio in the mountains, then by Mentana in the plains and Rieti in the mountains. In southern Italy and the islands, the order of merit in the plains was Frassineto 405, Littorio or Roma, Cappelli and Quaderna or Mentana; and in the mountains Cappelli, Frassineto 405, Dauno III and Mentana.

Observations on the diseases of other crops were continued, though on a reduced scale owing to war activities.

1158. AUSEMUS, E. R. and 633.11-2.111-1.521.6:575(73)
 BAMBERG, R. H. 633.11-2.4-1.521.6:575(73)
Breeding hard red winter wheats for the Northern Great Plains area.

J. Amer. Soc. Agron. 1947 : 39 : 198-206.

A brief review is presented of breeding work on hard red winter wheats for the northern limits of their range. The principal breeding objectives are greater winter hardiness, improved disease resistance and better milling and baking quality.

The Chinese Nanking varieties 68, 221 and 239 have been crossed with commercial varieties in order to improve winter hardiness. For improving resistance to leaf and stem rust, Hope and H-44 have been used as parents in a hybridization programme. Breeding for resistance to dwarf and ordinary smut is also in progress.

1159. PETROV, G. G. and 633.11-2.112-1.521.6
 SOKOLOVSKIĬ, A. P.
(The problem of drought resistance. I. On the transpiration of xeromorphic wheats.)

Trudy Omsk. Sel'skokochozjaistvennogo Inst. imeni S.M. Kirova (Trans. Kirov Inst. Agric. Omsk, U.S.S.R.) 1939 : 4 (17) : 3-22.

In discussing earlier work, the terminology of the subject and the conditions causing drought, it is pointed out that the most important feature of xeromorphic structure in plants consists in a reduction in cell size, and that cell size is related to drought resistance. The writers' problem was to determine how the intensity of transpiration in wheat altered when the xeromorphic habit was acquired or intensified under drought conditions. The technique of the pot experiments used is discussed in detail. Two pure lines, Milturum 0321 which is very drought resistant in the Omsk region and Kitchener which shows poor resistance, were used for the experiments.

Plants of both lines showed less intense transpiration under the most varied conditions of drought than plants grown under optimum conditions of soil humidity.

The problem is not solved, but observations have been collected on xeromorphic features such as the cell size and changes in leaf area.

1160. BALDACCI, E. and 633.11-2.112-1.521.6(45)
 CIFERRI, R.
 Studi sulla "stretta" dei cereali. (**Studies on premature ripening in cereals.**)

Atti Ist. Bot. e Lab. Crittogamico, Univ. Pavia 1944 : 1 : Ser. 5 : 217-76.

The condition concerned, consisting of hard grains brought about usually by a hot dry

spell just before the normal ripening time, has been reproduced artificially by treatment with hot wind in an experimental chamber. The method will be used to test the resistance of different varieties.

1161. BARTEL, A. T. 633.11-2.112-1.521.6:581.1
Some physiological characteristics of four varieties of spring wheat presumably differing in drought resistance.
 J. Agric. Res. 1947 : 74 : 97-112.

A study of the growth characteristics of the Baart, Ceres, Marquis and Hope wheats was carried out with a view to determining to what extent varietal differences in drought resistance are correlated with the moisture content of the leaf blades and with the osmotic pressure and total solids contents of the extracted leaf juices. The data obtained from irrigated and unirrigated plots showed that the deficit in soil moisture in the unirrigated or drought plot tended to result in a decrease in the leaf moisture content and an increase in the osmotic pressure and percentage of total solids of the extracted leaf juices. The reduction of the moisture content in the leaves in plants from the unirrigated plot was approximately the same for all four varieties; the average moisture content of the leaves showed negligible intervarietal differences, except in the case of Baart. The increases in osmotic pressure and percentage of total solids were greatest in Baart and least in Hope; the order of the varieties with respect to the osmotic pressure and total solids content was the same as their supposed drought resistance, i.e. Baart, Ceres, Marquis and Hope, in descending order of resistance.

1162. HAGBORG, W. A. F. and PETERSON, R. F. 633.11-2.3-1.521.6:578.08
A plot inoculation method for determining the resistance of wheat varieties to bacterial black chaff.
 Phytopathology 1947 : 37 : p. 8. (Abst.).

A simple method of inoculation with bacterial black chaff in field plots of wheat is described. The data obtained by analysis of variance provided a sound basis for selection.

1163. CALDWELL, R. M. and COMPTON, L. E. 633.11-2.451.2-1.521.6:575.1
Inheritance of resistance to loose smut of wheat, *Ustilago tritici*, in the varietal cross Trumbull x Wabash.
 Phytopathology 1947 : 37 : p. 4. (Abst.).

The data from the cross Wabash x Trumbull and the reciprocal, and from the back-cross Wabash ♀ x (Wabash x Trumbull) ♂ suggest that the loose smut resistance of Trumbull is dominant to the susceptibility of Wabash and is determined by a single factor; the results of the experiments also suggest that the infection of the susceptible progeny of resistant heterozygous plants is prevented by the covering parental tissues of the ovary.

1164. SIBILIA, C. 633.11-2.452:576.16(45)
 Determinazione di alcune razze fisiologiche italiane di "*Puccinia tritricina*" Erikss. e di "*Puccinia graminis tritici*" Erikss. et Henn. (**Determination of certain Italian physiological races in *P. tritricina* Erikss. and *P. g. tritici* Erikss. et Henn.**)
 Bol. Staz. Pat. Veg. Roma 1942 (1943) : 22 : 193-96.

Three races of *P. tritricina* and one of *P. graminis* var. *Tritici* not previously reported in Italy are described.

1165. PETURSON, B. 633.11-2.452:576.16:631.521.6(71)
Epidemiology of rust in western Canada as influenced by the introduction of stem-rust-resistant varieties.
 Phytopathology 1947 : 37 : p. 18. (Abst.).

It is reported that the occurrence and severity of stem rust show reduction as a result of the cultivation of stem rust resistant wheat and oat varieties. No marked change in the incidence of leaf rust is reported, however, doubtless owing to the fact that some of the stem rust resistant varieties are leaf rust susceptible. The growing of resistant varieties has produced no change in the physiological races of wheat stem rust occurring in western

Canada. Certain races of stem rust of oats, formerly rare and to which the new resistant oats varieties are susceptible, have greatly increased in prevalence, whereas races previously predominant have now decreased.

1166. FAVRET, E. A. 633.11-2.452:576.16:631.521.6(82)
Presencia de la raza 15 de "*Puccinia rubigo-vera tritici*" en la Argentina.
(The presence of race 15 of *P. rubigo-vera tritici* in Argentina).
Rev. Invest. Agríc. B. Aires 1947 : 1 : 63-64.

Race 15 of *P. rubigo-vera* var. *Tritici* has been discovered in Argentina.

1167. PETURSON, B.,
NEWTON, M. and
WHITESIDE, A. G. O. 633.11-2.452-1.521.6:664.641.016(71)
The effect of leaf rust (*Puccinia tritici*) on the yield, grade, and
quality of wheat.
Phytopathology 1947 : 37 : p. 18. (Abst.).

Experiments on the effect of leaf rust upon the yield, grade and quality of wheat varieties are reported.

1168. ÅKERMAN, Å.,
LINDBERG, J. E. and
AUGUSTIN, S. 633.11:664.641.016(48.5)
633.14:664.641.016(48.5)
Undersökningar av kvaliteten hos 1945 års brödsädesskörd. (Inves-
tigations on the quality of the 1945 bread cereal harvest).
Sverig. Utsädesfören. Tidskr. 1946 : 56 : 495-529.

This report gives full particulars of analyses of the quality of 512 samples of autumn wheats, 228 of spring wheats and 332 of rye from various districts in Sweden (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 1718).

OATS 633.13

1169. ÅKERMAN, Å. 633.13:575(48.5)
Svalöfs Siriushavre II. (The Svalöf Sirius II oat).
Sverig. Utsädesfören. Tidskr. 1947 : 57 : 42-45.

The breeding of medium late black oats in Sweden is proceeding along two lines: (1) improvement of yield, strength of straw and grain quality in the typical central Swedish varieties Engelbrekt II and Stormogul II [Great Mogul II]; and (2) the production of varieties, earlier than Engelbrekt II, suitable for southern Norrland and Bergslagen. Crosses between Sirius, now called Sirius I, and Engelbrekt II were made in 1928, and among the interesting and promising lines of the 01350 series, line Sv 01352 b₂ is being put on the market as Sirius II to replace Sirius I, which it equals in earliness, while possessing decidedly stiffer straw and giving a somewhat higher yield of grain; its grain quality is about equal to that of Sirius I. The new variety may also be of interest for Finland and France as well as the Swedish regions mentioned above.

The paper contains a translation into English of the technical terms used in the tables as well as an English summary.

1170. SUNDELIN, G. 633.13:575(48.5)
Försöksverksamhetens bidrag till lösandet av vårens växtodlingsproblem.
(The contribution made by research to the solution of the problem
of spring crops).
Lantmannen 1947 : 31 : 243-45.

This paper deals *inter alia* with the most suitable cereals for different regions of Sweden. A new stiff-strawed oat, Orion III, has been released and is intended for southern Norrland. It is derived from the well-known old Orion variety and it and the Same oat, are the most important varieties for areas in central and upper Norrland, where formerly only six-rowed barley was early enough to give a mature harvest.

1171. LACROIX, L. 633.13:575(49.3)
L'avoine à Gembloux, de 1932 à 1939. (Oats at Gembloux, from 1932 to 1939).
Bull. Inst. Agron. Gembloux 1941 : 10 : 53-83.

Tests of a number of varieties of oats are described including a number of new lines.
R. M. I.

1172. VIDME, T. 633.13-1.557:578.08:575(48.1)
Om dei morfologiske avlingskomponentane hjå nokre havresortar. (On the morphological components of yield in some varieties of oats).
Meld. Norg. LandbrHøgsk. 1940 : 20 : 203-28.

The morphological components of yield in cereals are discussed, with observations on the difficulties of genetic analysis of quantitative characters and breeding for such characters and on the physiological aspect of yield.

As the first step towards a breeding programme, a three-year study was here made of the oats Perle, Tor, Gullregn I and II, Kvit Odal and Kytø, all well known varieties in Norway. Their origins are given.

In all years, the six primary yield components, panicles per plant, whorls per panicle, branches per whorl, spikelets per branch, grains per spikelet, yield per panicle and yield per plant, were recorded; in two years, counts were made also of sterile spikelets, empty glumes and awned spikelets; and in one year, also of weight, length and thickness of straw, and length of lower and upper internodes as well. Significant varietal differences were found for all the characters.

The interaction between spacing and variety was also examined.

Clear varietal differences in yield structure were found and a cross is suggested between Kytø and the high yielding Gullregn varieties as a possible way of raising yield by combining high tillering and high number of whorls per panicle. These varieties, being complementary in other features too, seem to offer good chances of producing a high yielding type.

The number of grains per spikelet and the average seed weight are slightly affected by environment, so the number of spikelets per panicle offers an accurate enough basis for selection for panicle yield in breeding operations.

1173. HAGBORG, W. A. F. 633.13-2.19-1.521.6:575.11(71.27)
Investigations on grey speck of oats in Manitoba.
Phytopathology 1947 : 37 : p. 8. (Abst.).

Marked varietal differences in susceptibility to grey speck are reported. *Avena strigosa*, Black Mesdag, Ajax, Exeter and Laurel were among the more resistant of the 68 oats tested in 1946. A high degree of susceptibility was observed in varieties descended from Victoria, but linkage between resistance to stem and crown rust and susceptibility to grey speck was incomplete.

1174. STOA, T. E. 633.13-2.484-1.521.6(76.4)
A new oat disease.
Bi-m. Bull. N. Dak. Agric. Exp. Sta. 1946 : 9 : No. 2 : 46-47.

A *Helminthosporium* disease, causing root rot and leaf blight in oats, has been observed for the first time in North Dakota. Resistant varieties are discussed.

1175. ROSEN, H. R. 633.13-2.484-1.521.6(76.7)
Helminthosporium blight of oats in Arkansas.
Phytopathology 1947 : 37 : p. 19. (Abst.).

Under field conditions in Arkansas, *Helminthosporium* blight has only been observed on oat varieties whose parentage involves Victoria; under greenhouse conditions, however, the disease has been observed not only on derivatives of Victoria but also on a few other varieties. Marked varietal differences in susceptibility have been noted.

1176. MACKEY, J. 633.13.00.14(48.5)
Vithavresorter för fastmarksjordar i södra och mellersta Sverige.
(White oat varieties for mineral soils of south and central Sweden).
Sverig. Utsädesfören. Tidskr. 1947 : 57 : 46-61.

Based on the results of investigations during the last ten years by the Swedish Seed

Association and the Agricultural Research Institute [Sveriges Utsädesföreningen and Jordbruksförsöksanstalten], this report aims at comparing the performance and suitability of the more important varieties of white oats with reference to the mineral soils of southern and central Sweden, and at estimating whether the dominant position of the older varieties among growers is justified.

Details of the characteristics of many well known varieties are given. Örn [Eagle] and Seger [Victory] are mentioned as being more susceptible to manganese and copper deficiency in the soil than other varieties, and Örn and Sol II as being resistant to frit fly.

RYE 633.14

1177.

633.14:575.127.5:633.11

633.16:576.356.5

MÜNTZING, A.

Några försöksresultat med rågvete och tetraploidt korn. (**Some experimental results with rye-wheat and tetraploid barley**).

Nord. JordbrForskn. 1943 : Nos 5-6 : 250-62.

This paper consists largely of a survey of work already reviewed from time to time in *Plant Breeding Abstracts*.

In discussing polyploid barleys and their yields, reference is made to the results obtained with tetraploid Opal B, tetraploid hybrid barley and *Galeopsis pubescens*, showing that chromosome doubling within a species may give significantly different results according to the genotypic constitution of the parent forms. Tetraploid forms have shown a high protein content and stiff straw.

The heat shock and colchicine techniques are discussed.

A similar line of work has been followed with rye, and, though a detailed report cannot yet be made, the following points are of interest:—

Tetraploid ryes show marked differences in yield and other features. Aneuploid aberrant forms can be greatly reduced in number by grain selection to eliminate grains of inferior quality.

Work is in progress on the 56-chromosome rye-wheat *Triticale*, of which a large collection has now been produced by (1) crossing and recombination of existing rye-wheat types; (2) crossing primary 28-chromosome wheat by rye hybrids and existing rye-wheats; (3) crossing rye-wheat and wheat; and (4) colchicine treatment of F_1 hybrids from wheat and rye crosses. The colchicine technique has made methods (2) and (3) almost superfluous; the rye-wheat hybrids with the double chromosome number are used for group crossing and hybridization of the best types. This method should, in view of the great variation in earliness, high protein and large loaf volume exhibited in the collection, ultimately produce rye-wheats of practical utility. The partial sterility of the hybrids is correlated with disturbances in meiosis, which are due possibly to the great sensitivity of rye to inbreeding. But types with stable meiosis could probably be obtained.

Two series of experiments in 1941-42 with rye-wheats and Svea II, Skandia II, Sol III and Triticale A and C as controls are recorded. Of the hybrid rye-wheats, 14 gave higher yields than the Triticale controls A and C; and Selections 1-9 are specially interesting, as representing recombination forms in the F_5 and F_6 from Triticale C x A crosses, and as being considerably higher yielding than the parents. Further confirmation of this is, however, needed.

Analysis of the results showed that in 1942 the best rye-wheat varieties in the experiment approximately equalled the control wheats in yield, whose yield was, however, reduced by the severity of the winter.

The rye-wheats also showed an exceptionally high crude protein content, 16.3-19.6%, as compared with 14.3% for Svea II, the only wheat analysed. The figures for the product of the average grain weight and the protein content, which gives the yield of protein per plot, was 81 gm. for Svea II, and for the rye-wheats 61-113 gm. The 1000 corn weight for the wheats ranged from 35.2 to 40.0 gm., and for the rye-wheats 1-14 from 41.0 to 52.0 gm., and for Triticale A and C 39.0-38.6 gm.

The gluten percentage for the rye wheats was 38.2-49.0, as compared with 27-28 for the wheats tested, and 0 for rye.

The Pelshenke test for baking value was also applied.

1178. ROSENSTIEL, K. v. and
MITTELSTENSCHIED, L. 633.14:576.356.5:633.11
Über die Erzeugung amphidiploider Roggen-Weizen-Bastarde (*Secalotrica*). [On the production of amphidiploid rye-wheat hybrids (*Secalotrica*)].
Züchter 1943: 15: 173-83.

The author discusses types of wheat-rye and amphidiploids in which the mother plant was wheat, and also suggests that, if the hybrid genome were to be in rye plasm, instead of wheat plasm, more satisfactory types might be obtained.

In 1941, 6965 rye flowers and in 1942, 4002 rye flowers were pollinated by wheat pollen and a set of 43 and 21 grains was obtained respectively. The first group gave 12 and the second group 18 hybrids, which were multiplied vegetatively in the greenhouse. On pollination by *Triticale*, the F_1 hybrids of the first group gave a set of 73 grains. The resultant plants had chromosome numbers approximately equal to 56, showing that the genomes of wheat and rye in rye plasm had united to produce an amphidiploid rye x wheat hybrid.

Incidentally, it is mentioned that the F_1 from crossing rye by wheat showed plants of a rye type and plants of a wheat type. All the plants in the first group of the rye type were attacked by mildew, but those of the wheat type were not.

Collected results of the authors and others show that when *Triticale* pollen is used to fertilize the F_1 from wheat x rye, the set is always higher than when pollen of one of the parents is used. E. W.

MAIZE 633.15

1179. MELHUS, I. E.,
SEMENIUK, G. and
WALLIN, J. R. 633.15(72.81)
The influence of climate on distribution of corns in Guatemala.
Amer. J. Bot. Suppl. 1946: 33: p. 825. (Abst.).

The maize varieties of Guatemala are classified under three heads: (1) early varieties with 9-14 leaves occurring in the highlands, (2) mid-season varieties with 15-21 leaves found at all altitudes, and (3) late varieties with 22-35 leaves confined to the highlands. The mid-season varieties growing under tropical conditions are unpigmented; marked anthocyanin formation characterizes the alpine forms.

1180. ZAPPAROLI, T. V. 633.15:575"793"(45)
Il granoturco cinquantino "Davini". (The early maize Davini).
Ital. Agric. 1940: 77: 455-59.

This variety used for summer planting after a wheat crop, was produced by selection from among the best types grown by cultivators in the Lucca region. It is characterized by extreme earliness, short stature and high yield, amounting in the most favourable conditions up to 50 centners per hectare.

1181. FOGEL, S. 633.15:575.11.061.6:581.04
Allelic differentiation and correlations in gene action.
Genetics 1947: 32: p. 86. (Abst.).

Anthocyanin production may be induced in excised sections of green maize leaves of appropriate genotypic constitution when floated on buffered glucose solutions in the presence of light. The total amount and rate of pigment synthesized is partly a function of the gene *R* and its alleles, which determine specific and general anthocyanin pigmentation (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 1243). Experiments were carried out to determine the possible correlation of anthocyanin synthesis in the presence of glucose, as conditioned by five *r* alleles, with the production of anthocyanin in the general plant body and specific tissues under normal conditions. The alleles did not exhibit the same order of potency for anthocyanin production in the presence of glucose as they show under usual conditions of pigment synthesis.

- 1182 MANGELSDORF, P. C. 633.15:575.116.1:578.08
Treating genetic data with punched cards.
 Genetics 1947 : 32 : p. 96. (Abst.).

Reference is made to a method of determining the relationship between two or more genes in a test cross, in which use is made of punched cards, appropriately slotted to distinguish between dominant and recessive alleles. The application of the method has been demonstrated by data from a cross between a derivative of teosinte and a maize linkage tester line, in which nine out of the ten chromosomes are marked on the cards.

1183. JENKINS, M. T. 633.15:575.12(73)
Report of the Eighth Corn Improvement Conference of the North Central region.
 U.S. Dep. Agric. Pl. Ind. Beltsville, Md 1946 (1947) : Pp. 26. (Mimeo-graphed).

Brief reports are given of the discussions held on the following subjects: (1) the technique of testing for disease resistance in maize breeding; (2) methods of determining insect resistance; (3) the technique of breeding sweet corn for canning; (4) methods of selection in segregating maize populations, including standard methods, early testing, "gamete selection", recurrent selection and visual selection; (5) the question of whether the trend in hybrid production will be towards the use of simpler or more complex combinations; and (6) breeding for industrial utilization.

Summaries are also presented of the reports of the various committees concerned with following activities: (1) the preservation of varieties and strains; (2) the designation of inbred lines and hybrids; (3) recommended methods of recording the incidence and severity of seedling blights; (4) the selection of inbred lines for the early uniform tests; (5) the exchange of inbred lines between experiment stations; (6) the mid-season uniform tests; and (7) the late uniform tests.

1184. MORRISON, G. 633.15:575.12(73)
Hybrid corn—Science in practice.
 Econ. Bot. 1947 : 1 : 5-19.

A succinct historical account is given of hybrid corn, and the methods of producing it are described. It is mentioned that its use added 669 million bushels of corn to the total crop in the U.S.A. in 1943.

1185. DRUMMOND, G. A. 633.15:575.12(81)
 Algumas explicações sobre os milhos híbridos. (Some explanations on hybrid maize).
 Ceres, Brasil 1946 : 7 : No. 37 : 34-41.

The work done in Brazil, and in particular at the School of Agriculture at Viçosa, on the production of hybrid maize is described. Two methods are being employed, viz. the bulk hybridization of varieties without preliminary selfing, and the crossing of pure lines. The first method has been used chiefly till now and is exemplified by the high yielding combination Catete x Amarelão. Hybridization of pure lines will replace bulk hybridization in the future, however, and the technique of accomplishing it is described.

1186. SINGLETON, W. R. 633.15:575.14:575.242
Mutations in maize inbreds.
 Genetics 1947 : 32 : p. 104. (Abst.).

The following mutations in maize inbred lines are reported. Purdue 39, the most widely used sweet corn inbred, has mutated to a reduced plant, C30, with a more cylindrical ear than Purdue 39 and an evergreen type of kernel. Hybrids involving C30 have shown slightly more vigour than comparable crosses involving Purdue 39. In inbreds derived from crosses between Purdue 39 and C30, several variations have arisen, which include defective and germless seed, a lethal virescent seedling, and seed resembling the brittle endosperm variation which produces lethal seedlings. All the characters segregate in simple Mendelian ratios. Mutations affecting combining ability have also apparently occurred.

Reference is also made to the observations of Jones on mutations in standard inbred lines of field maize.

1187. WEATHERWAX, P. 633.15:576.16(85)

Primitive characteristics in a Peruvian variety of maize.

Amer. J. Bot. Suppl. 1946 : 33 : p. 827. (Abst.).

A maize variety has been observed in the Andes of Peru, which is characterized by axillary ear branches, indeterminate pistillate inflorescences, mixed inflorescences, a branched main stem and two-flowered pistillate spikelets. These characters are regarded as primitive.

1188. MANGELSDORF, P. C. 633.15:576.356.2:576.16

The genetic nature of teosinte.

Genetics 1947 : 32 : 95-96. (Abst.).

Annual teosinte, the closest relative of maize, differs from it chiefly by a small number of chromosome segments which are usually inherited intact. Varietal differences in the number of these segments are indicated. All of the segments possess similar genetical effects, reducing the size of seed and number of rows of grain, and increasing the prominence of the glumes and fragility of the rachis. The available evidence suggests that the teosinte varieties studied are the result of hybridization of maize with species of another genus, probably *Tripsacum* or possibly a form of teosinte yet to be discovered.

1189. RHOADES, M. M. 633.15:576.356.56:576.354.46:575.116.1

Crossover chromosomes in unreduced gametes of asynaptic maize.

Genetics 1947 : 32 : p. 101. (Abst.).

Investigations on the production of diploid gametes by asynaptic maize plants indicated that a considerable percentage of crossing over occurred in the *sh-wx* region of chromosome 9. This result is not in agreement with the generally held views on the relationship between crossing-over and chiasmata, and between chiasmata and post-diplotene association.

1190. JONES, D. F. 633.15:581.036:581.162.5

Effect of temperature on the growth and sterility of maize.

Science 1947 : 105 : 390-91.

When seedlings of the F_1 maize hybrid $WF_9 \times P8$ were germinated in an incubator at $30^\circ C$, the resultant plants proved shorter and later maturing than the controls; they were also male sterile.

1191. BRIEGER, F. G. 633.15:581.46:576.16:575.113.5

Estudos sôbre a inflorescência de milho com referência especial aos problemas filogenéticos. (Studies on the inflorescence of maize with special reference to phylogenetic problems).

Bragantia, São Paulo 1945 : 5 : 659-716.

A series of anomalous inflorescences are described from maize and maize x teosinte hybrid material. These include hermaphrodite flowers, spikelets with more than two inflorescences and an increase in the number of spikelets per alveolus.

It is suggested from these and other findings that the wild ancestor of maize had tunicate hermaphrodite spikes with two rows of alveoli and possibly more than two flowers per spikelet, and that this grass, perhaps not a member of the Andropogoneae, crossed with a form of *Tripsacum*, from which the gene *tu* (etunicate) was derived and passed on to the segregates that eventually gave rise to maize.

Major genes are not regarded as the most important factors determining the development of the different forms of the maize inflorescence. Instead, it is suggested that modifier complexes are the fundamental causes of inflorescence variation. An evolutionary shift in the modifier complexes is thought to account more satisfactorily for the "inherent phylogenetic trends" of the Gramineae than the concepts of random mutation and selection.

1192. CAMERON, J. W. 633.15:581.483:581.192:575.11

A study of the genic control of carbohydrates in maize endosperm.

Genetics 1947 : 32 : 80-81. (Abst.).

A summary is given of investigations on the effects of combinations of su_1 , an allele of su_1 termed the "amylaceous" factor (su_1^{am}), and the dominant and recessive alleles of an independently inherited gene *du* known as "dull", upon the amount and type of carbohydrate in the mature endosperm of maize.

1193. SEMENIUK, G.
WALLIN, J. R. and
MELHUS, I. E. 633.15-2.411.4-1.521.6(77.7)
Root-necrosis resistance in maize.
Phytopathology 1947 : 37 : p. 20. (Abst.).

Tests of maize collections from the United States, Mexico, Guatemala and South America for their reaction to *Pythium graminicola* are reported.

1194. TAPKE, V. F. 633.16-2.484-1.521.6:578.08
New methods of artificial seed inoculation for testing the resistance of spring and winter barleys against stripe, *Helminthosporium gramineum*.
Phytopathology 1947 : 37 : p. 21. (Abst.).

A technique for the artificial seed inoculation of barley being tested for resistance to *H. gramineum* is described. The seed is inoculated with mycelial fragments in aqueous suspension. In general an inoculation period of 4-6 days at 7°-10° C. has been found to be the most satisfactory method of producing heavy stripe infection with only moderate reduction in seedling emergence. In experiments on the resistance of winter barleys raised in the greenhouse, a modification of the "mycelial-fragments" method combined with seed vernalization has given good results.

BARLEY 633.16

1195. VIK, K. 633.16.00.14:581.02(48.1)
633.16:575(48.1)
Ulike reaksjon for sommervarme og nedbør hos toradsbygg og seksradsbygg. (**Different reaction of two-rowed and six-rowed barleys to warm summer and rainfall.**)
Meld. Norg. LandbrHøgsk. 1941 : 21 : 127-80; also 50. Arsmeld Norges LandbrHøgsk. Åkervekstforsøk 1942 : 1-54.

As material for this study made in Norway, 188 variety trials of barley from 1914 to 1939 and sowing-date trials from 1917 to 1931 were used.

The two-rowed *erectum* types seemed to tolerate lower temperatures better than the *nutans* types. The most productive two-rowed varieties were Maja, Opal B, Opal and Kenia, and the best six-rowed barley was Asplund, from which some apparently even higher yielding hybrids have been obtained, including the smooth awned line 01-44.

New varieties from Asplund x Maskin have been distributed in recent years by Norwegian breeders; Varde seems the most promising, but after 17 trials has not outyielded Asplund. Kjevik Stjerne from the same cross is among the best yielders.

The performance of Maskin, Vega, Jadar and Solen is also mentioned. Maskin suffers under high temperatures and is susceptible to frit fly.

MILLETS AND SORGHUM 633.17

1196. BURLEY, R. and
GRAHAM, H. 633.174:575(73)
New sorghums are valuable grain crop.
Successful Fmg 1947 : 45 : No. 2 : 53-54.

An account is given of the improved sorghums developed in recent years in the United States, with particular reference to breeding work in Oklahoma. A discussion is given of future aims of breeding and of new developments in the uses of sorghum.

1197. QUINBY, J. R. and
KARPER, R. E. 633.174:575.11:575.125
Heterosis in sorghum resulting from the heterozygous condition of a single gene that affects duration of growth.
Amer. J. Bot. 1946 : 33 : 716-21.

Sorghum plants carrying the heterozygous gene pair *Ma ma* are larger and tiller more than the corresponding homozygotes. It is concluded therefore that heterosis in sorghum results from increased tillering and a greater rate of cell division. The dominant genes

Ma_2 and Ma_3 , which delay maturity, allow the heterotic effect of $Ma\ ma$ to extend over a longer period, and thereby to become more pronounced.

1198. BARHAM, H. N.,
WAGONER, J. A.,
CAMPBELL, C. L. and
HARCLERODE, E. H. 633.174:581.192 (78.1)
The chemical composition of some sorghum grains and the properties of their starches.

Tech. Bull. Kans. Agric. Exp. Sta. 1946 : No. 61 : Pp. 47.

Chemical composition of the grain and starch properties were analysed in the following varieties: Feterita, Finney Milo, Cheyenne, Hegari, Red Kafir, Wheatland, Early Sumac, Blackhull Kafir, Early Kalo, Atlas, Pink Kafir, Leoti Red and Schrock.

RICE 633.18

1199. BALDACCI, E. 633.18:581.162.5
Ricerche ed esperienze sulle malattie del riso. IV. Alcune manifestazioni di sterilità della pannocchia. (**Researches and experiments on rice diseases. IV. Some manifestations of panicle sterility**).
Atti Ist. Bot. e Lab. Crittogamico, Univ. Pavia 1945 : 5 : Ser. 5 : 249-74.

Various forms of panicle sterility in rice, some due to ecological, some to parasitic, and others to genetic causes, have in the past been referred to as "brusone". The different types are here described clearly. At least two genetic types are recognized, one in which the whole panicle is sterile, and the other which affects only the apical, or occasionally also the basal spikelets.

1200. PORTÈRES, R. 633.18:581.4:575
Les riz flottants de l'espèce *O. sativa* L. et leurs possibilités d'exploitation en Afrique. (**The floating rices of the species *O. sativa* L. and the possibilities of utilizing them in Africa**).
Agron. Trop. 1946 : Nos 9-10 : 467-503.

A review is presented of present knowledge of the floating rices included in *O. sativa*. Their taxonomy is discussed, and keys are presented for the identification of the various botanical varieties and forms. The morphological basis of the floating habit and the genetical factors determining it are described.

Detailed accounts follow on the floating rices of Indo-China and on the varieties introduced thence into West Africa. The geographical distribution of the latter is described. After discussing the cultivation of the floating forms, the following breeding objectives are listed: (1) the production of forms with persistent spikelets, (2) the elimination of red caryopses, (3) the development of forms in which the caryopses are not brittle, (4) the production of forms with less conspicuously veined glumes, (5) the development of plants with abundant tillers, and (6) the production of early forms.

1201. I risi perennanti (*Oryza perennis* e *O. latifolia*) della Repubblica Dominicana. [**The perennial rices (*O. perennis* and *O. latifolia*) of the Dominican Republic**].
Atti Ist. Bot. e Lab. Crittogamico, Univ. Pavia 1946 : 7 : Ser. 5 : 7-17.

In spite of the tendency of other authors to lump these two species, they are regarded as distinct, and descriptions of them are given, both as regards their botanical characteristics and their general habits of growth.

1202. PIACCO, R. 633.18-2.183-1.521.6(45)
L'allettamento nel riso. (**Lodging in rice**).
Ital. Agric. 1940 : 77 : 565-72.

In the course of this general discussion of the problem of lodging in rice, some observations are made on the standing capacity of the main Italian varieties. The best in this respect is Balilla (Ardito), and the new varieties 12, 136, 16, Roma, Senatore Novelli and Pierrot are classed as satisfactory.

1203. RYKER, T. C. 633.18-2.484:576.16:631.521.6(76.3)
New pathogenic races of *Cercospora oryzae* affecting rice.
 Phytopathology 1947 : 37 : 19-20. (Abst.).

In work on the control of the *Cercospora* leaf spot of rice in Louisiana, the Rexoro, Fortuna and Nira varieties were classified as resistant, and Blue Rose as susceptible. Race 4, infecting only Fortuna, was reported in 1940. Race 7, to which Fortuna and Blue Rose are susceptible, was identified in 1940. The Rexoro variety has become badly diseased since 1944 with race 6. Nira, the only remaining variety formerly classified as resistant, has also recently shown infection, due to a new biotype designated race 8. Of the 6 differential varieties used, Fortuna is susceptible to race 8, in addition to Nira, while Blue Rose, Blue Rose 41, Caloro and Rexoro exhibit resistance.

1204. CIFERRI, R. 633.18-2.8(45)
 633.18-2.484-1.521.6(45)
 Relazione sull' attività del R. Laboratorio Crittogamico e del R. Osservatorio di Fitopatologia di Pavia durante l'anno 1942. (**Report on the activities of the Royal Cryptogamic Laboratory and the Royal Phytopathological Observatory at Pavia for the year 1942**).
 Atti Ist. Bot. e Lab. Crittogamico, Univ. Pavia 1943 : 1 : Ser. 5 : 1-83.

In reviewing the activities of the Cryptogamic Laboratory of the University of Pavia for the year 1942, an outline is given of the work done in connexion with the different crops. It is pointed out that the disease "brusone", much feared in the last century, has almost disappeared owing to the introduction of new and improved varieties. The term was used to embrace a number of different maladies, some of a genetic nature, and some due to fungal infection, especially *Piricularia*, but also *Sclerotium*.

FORAGE GRASSES 633.2

1205. NILSSON-LEISSNER, G. 633.2/3:575(48.5)
Professor Hernfrid Witte.
 Nord. JordbrForskn. 1945 : Nos 1-2 : 45-46.

In this obituary notice and appreciation of Hernfrid Witte's contribution to plant improvement in Sweden, special mention is made of his work in connexion with seed control and on the production of new varieties of herbage plants.

1206. LUND, A. 633.2/3:581.6:578.08(48.9)
 Undersøgelser over Karotinindholdet i Foderplanter. (**Investigations on the carotene content in fodder plants**).
 Nord. JordbrForskn. 1942 : No. 7 : 321-40.

The reasons for the different findings by various workers investigating carotene content in fodder plants are examined, with due reference to the question of technique and the importance of determining the stage of plant development at which the maximum content prevails.

The author's own experiments with grasses and clovers are recorded in detail, and a short note is also given on the results of analyses of carotene in carrots, swedes and turnips.

1207. GRØNTVED, P. 633.2/3-1.521.1(48.9)
 Erfaringer og Forsøg med Renholdelse af Froafgrøder. (**Experience and experiments on the maintenance of purity in crops grown for seed**).
 Nord. JordbrForskn. 1943 : Nos 5-6 : 197-202.

The subject is discussed with reference to seed production of leguminous pasture plants and grasses.

1208. LOVE, R. M. 633.2:581.04:576.356.5:575.12
 633.285:575.127.2:575.125
Interspecific and intergeneric hybridization in forage crop improvement.
 J. Amer. Soc. Agron. 1947 : 39 : 41-46.

The value of cytogenetical studies in breeding forage grasses is discussed.

Experiments on *Stipa* have indicated that the use of F_1 sterile interspecific hybrids possessing hybrid vigour may prove an important method of improvement. Interspecific hybrids of *Stipa* produced by the natural crossing of inbred strains showed increased vegetative growth, by means of which the grazing season could be prolonged several weeks. In 1945, a series of plots was seeded with various strains of *Stipa* spp., using two species to a plot, in order to determine the crossability of the different strains. Strains which show a suitable degree of compatability will then be sown on the range, so that the F_1 interspecific hybrids may be studied. The strains used are hardy and drought resistant, and it is expected that the F_1 hybrids will exhibit hybrid vigour in these characters.

A discussion is also given of the uses in forage grass improvement of true-breeding amphidiploids, hybridization between related non-segregating amphidiploids followed by selection, selection of the progeny obtained from segregating amphidiploids, and fertile derivatives produced by natural crossing of nearly sterile wide crosses, reference being made to the results of hybridization between wheat and *Agropyron*.

1209. REEDER, J. R. 633.2:581.481:582

Additional evidences of affinities between *Eragrostis* and certain Chlorideae. . .

Amer. J. Bot. Suppl. 1946 : 33 : p. 843. (Abst.).

The structure of the embryos of species of *Eragrostis*, *Eleusine*, *Dactyloctenium* and *Lep-
tochloa* justifies their inclusion in a separate tribe, the Eragrostae.

1210. SMITH, D. C.,
NIELSEN, E. L. and 633.21:575
AHLGREN, H. L. 633.21-2.4-1.521.6

Variation in ecotypes of *Poa pratensis*.

Bot. Gaz. 1946 : 108 : 143-66.

The progenies of 800 samples of *P. pratensis* from 27 American states have been studied; 541 of the samples came from Wisconsin. Observations on percentage of aberrant plants, early and late vigour, habit, aggressiveness, leafiness, maturation time, plant height, and resistance to *Erysiphe graminis*, *Puccinia Poae-sudeticae* and *Helminthosporium vagans* are recorded. Regional differences in these various characteristics are noted.

1211. KRAMER, H. H. 633.21:581:576.312.35
**Morphologic and agronomic variation in *Poa pratensis* L. in
relation to chromosome numbers.**

J. Amer. Soc. Agron. 1947 : 39 : 181-91.

Details are given on the variation shown by local and introduced races of *P. pratensis* in such characters as spreading rate, yield, protein content, midsummer drying, leafiness, stem development and resistance to mildew. The chromosome number of the various clones varied from $2n = 50$ to $2n = 85$, but there was little evidence of any correlation between chromosome number and morphological or physiological characters. Susceptibility to mildew and spreading rate were correlated to chromosome number with coefficients of $r = +0.48$ and $r = +0.41$ respectively.

1212. THOMAS, H. L. and
HAYES, H. K. 633.21-1.557:581.6(77.6)

A selection experiment with Kentucky bluegrass.

J. Amer. Soc. Agron. 1947 : 39 : 192-97.

An account is given of the yield and protein content of a series of clones of *Poa pratensis* L., collected from various localities in Minnesota. Significant interclonal differences in these characters are reported, also differences in reaction to seasonal conditions.

- 1213 STEBBINS, G. L. (jun.) 633.262:576.356.5:576.16:575.127.2
Artificial synthesis of old and new polyploid species in *Bromus*.
Genetics 1947 : 32 : 107-08. (Abst.).

The annual species *B. arizonicus* has 42 pairs of medium sized chromosomes. When this species is hybridized with the perennial species *B. carinatus* ($2n = 56$), a sterile hybrid is produced, which usually possesses seven medium sized trivalents, 14 medium sized bivalents, 14 medium sized univalents and seven large univalents, the latter being derived from *B.*

carinatus. The perennial species has four distinct genomes, designated ABCD, while the annual species has six, viz., ABCC'DE.

Data have been obtained indicating that the ABC genomic group is present in three South American species, *B. catharticus*, *B. Haenkeanus* and *B. stamineus*, in all of which $2n = 42$. An F_1 hybrid between *B. catharticus* and *B. Trinii* ($2n = 42$) showed seven pairs of chromosomes at meiosis, and the allopolyploid ($2n = 84$) derived from it resembled *B. arizonicus*. Since the differences between the allopolyploid *B. catharticus-Trinii* and *B. arizonicus* are parallel to those between *B. catharticus* and *B. Haenkeanus*, it is suggested that *B. arizonicus* is a derivative of the hybrid *B. Haenkeanus* x *B. Trinii*.

The new allopolyploid species, *B. carinatus-Trinii* and *B. maritimus-Trinii*, both of which possess the genomic constitution ABCC'DEL, are vigorous and fertile, and their establishment under natural conditions is being attempted. The later allopolyploid shows promise as a means of restoring livestock ranges in California.

1214. MYERS, W. M. and

HILL, H. D.

633.264:576.356.5:575.12

Distribution and nature of polyploidy in *Festuca elatior* L.

Byll. Torrey Bot. Cl. 1947: 74: 99-111.

Pennsylvanian material of *F. elatior* appears to be diploid with $2n = 14$ chromosomes; var. *arundinacea* (Schreb.) Wimm. of the same species, however, is hexaploid with $2n = 42$ chromosomes.

Descriptions are given of the external morphology and the course of meiosis in the two forms. While meiosis is regular in the diploid race, multiple associations and other irregularities occur in the hexaploid. The F_1 hybrid of the two races is highly sterile, but the high frequency of chromosome pairing shows that there is considerable affinity between the chromosome sets of the two races.

1215. KREITLOW, K. W. and

MYERS, W. M.

633.264-2.452-1.521.6

Resistance to crown rust in *Festuca elatior* and *F. elatior* var. *arundinacea*.

Phytopathology 1947: 37: 59-63.

Most of the collections of *F. elatior* ($2n = 14$) showed susceptibility to *Puccinia coronata*, while those of *F. elatior* var. *arundinacea* ($2n = 42$) were usually resistant. The variability in the crown rust reaction of the Svalöf and Øtøfte strains of *F. elatior*, however, suggested that it might be possible to select individual plants from this material.

1216. BROWN, W. V.

633.283:576.312.35

A cytological study in the Paniceae.

Amer. J. Bot. Suppl. 1946: 33: p. 818. (Abst.).

A basic chromosome number of $x = 9$ has been found in species of *Digitaria*, *Leptoloma*, *Axonopus*, *Sacciolepis*, *Oplismenus*, *Echinochloa*, *Setaria*, *Cenchrus*, *Amphicarpum* and *Panicum*. In *Paspalum* and *Stenotaphrum*, the basic chromosome number is $x = 10$.

Aneuploids intermediate between the tetraploid and hexaploid conditions were discovered in *Digitaria sanguinalis*. *Cenchrus tribuloides* has $2n = 34$ chromosomes in contrast to the more typical $2n = 36$ chromosomes of *C. pauciflorus*. Diploid, tetraploid, hexaploid and dodecaploid forms are reported in *Paspalum*.

Chromosome fragments occur in *Panicum virgatum*. Most of the species studied of this genus were diploids though a few tetraploids were also observed.

Only $2n = 54$ chromosomes were counted in *Axonopus affinis* in contrast to an earlier report of $2n = 80$.

1217. TRYON, R. M. (JUN.) and

BOOHER, L. E.

633.289:575.22(77.6)

Remarks on the genus *Elymus* in Minnesota.

Amer. J. Bot. Suppl. 1946: 33: p. 843. (Abst.).

The natural variation of *E. canadensis*, *E. villosus*, *E. interruptus* and *E. virginicus* in Minnesota is described.

LEGUMINOUS FORAGE PLANTS 633.3

1218. GRANDFIELD, C. O. and
THROCKMORTON, R. I. 633.31(78.1)
Alfalfa in Kansas.
Bull. Kans. Agric. Exp. Sta. 1945 : No. 328 : Pp. 64.

The bulletin includes a section on lucerne varieties, which gives information on the main groups of lucerne, the relative importance of the different varieties in Kansas, the recently developed Buffalo, Ranger and Atlantic varieties, varietal and strain testing, and varietal reaction to diseases and cold.

1219. ÅKERBERG, E. and 633.321:575(48.5)
JULÉN, G. 633.321-1.531.12(48.5)
Vårt svenska rödklövermaterial i belysning av utförda stamförsök.
(**Our Swedish red clover as judged from results of strain trials**).
K. LantbrAkad. Tidskr. 1946 : 85 : 541-93.

A detailed account is given of an investigation on the position of the trade in red clover seed in Sweden, and on the selection of valuable local strains and their registration. Authority to register local strains has been vested in the Central Seed Testing Station. To discover a basis for the selection of strains, the present study of all red clover trials in Sweden has been made at the request of the Swedish Seed Growers Association (Sveriges Fröodlareförbund). This report comprises: an historical and systematic study of the different types of red clover now grown; a critical summary of red clover trials in Sweden arranged by provincial districts; and a short survey of the most valuable strains so far tested, with a fuller report on those now proposed for registration and on original stock seed of bred strains as well. Notes are also appended on valuable strains, not yet adequately tested for the various districts, but suggested as material for inclusion in future trials and breeding operations.

1220. BJÄLFVE, G. 633.367:581.43:581.6(48.5)
Baljväxternas rotknölar hos olika sorter. (**Root nodules of legumes of different varieties**).
Lantmannen 1947 : 31 : 302-04.

Experiments in 1933 and 1935 showed that: (1) root nodule formation and production differed in varieties, but was relatively uniform within pure lines; (2) factors such as assimilable nitrogen and circulation of air may cause variation; and (3) varieties with comparatively poor nodule formation need a relatively high amount of easily available N, while varieties with good nodule formation do very well on N assimilated only from the air. These results have now been applied in the study of yield in blue and yellow lupins. Nodule formation had already been studied in blue and yellow lupins, and the white sweet lupin. In the yellow lupins the nodules are mostly high up and on the main root, whereas in the blue they are widely dispersed.

An effective strain of the bacterium inoculated is necessary as infection by an inferior strain leads to nodule formation lower down on the roots. The strain used in the pot experiments here recorded was obtained from Denmark in 1941. Germination was poor and less than ten plants per pot were obtained. The blue lupins had not reached the flowering stage, whereas the yellow flowered almost a month before harvesting.

The two blue bitter varieties in the experiment showed poor nodule formation, the nodules being chiefly on the main root in No. 1 mostly in the upper region, and in No. 2 mostly below. The five blue sweet varieties showed the most abundant nodule formation and the highest yield. With one exception the nodules were distributed along the root system and on the main and secondary roots.

All four of the yellow sweet varieties developed nodules up above on the root system and chiefly on the main root. In the variety Yellow Sweet, root and nodule formation was weaker and the yield definitely poorer than in the other yellow sweet lines. In these same respects, the Lemon Yellow sweet lupin resembled the other yellow sweet lines.

The best blue lupins, in spite of their prolific nodule formation, did not equal the various yellow sweet lupins in yield, probably because the blue is considerably later.

More extensive experiments, in which different strains of bacteria will be used, are planned on nodule formation in different varieties and its effects on yield.

1221. SCHANDER, H. 633.367-2.191:575
Gedanken über Unterschiede und Übereinstimmungen der Chloroseerscheinungen von Lupinen und Holzgewächsen. (**On the differences and agreements in chlorosis phenomena in lupins and woody plants**).
Gartenbauwiss. 1942-43 : 17 : 304-09.

Chlorosis and similar diseases in lupins and woody plants have been studied.

An optimum pH for the sap of healthy young lupins was found. Increase in the pH promotes chlorosis; pH of the soil is also a factor. Certain pure lines of *Lupinus luteus* have different optima for pH. Land varieties, being heterogeneous genetically, give unsatisfactory results. The author used various strains of Müncheberg sweet lupins. Woody plants which are not genetically pure must be studied by a different method and clones should be used. E. W.

1222. RITCHEY, G. E. 633.37(75.9)
Hairy indigo, a legume for Florida.
Pr. Bull. Fla Agric. Exp. Sta. 1946 : No. 624 : Pp. 4.

An account is given of the hairy indigo plant, which has recently attracted attention as a possible summer forage or green manure crop in Florida. An early maturing strain has been developed; it is expected that this strain will extend the limit of adaptation into Georgia and other southern states.

ROOTS AND TUBERS 633.4

1223. L., G. N. 633.4:575:007(48.5)
P. A. Olsson.† 635.1:575:007(48.5)
Nord. JordbrForskn. 1945 : Nos 1-2 : p. 44.

Scandinavian agriculture is indebted to the late P. A. Olsson, whose death is announced here, for his services in many spheres, including his work on root crop breeding at Svalöf, where he directed the research done by the Swedish Seed Association on this subject.

1224. FRANDSEN, H. N. 633.416:576.356.5(48.9)
Kan vi haeve Foderroernes Udbytte 10-20 pCt. ved Anvendelse af Triploider? (**Can we increase the yield of fodder beets by 10-20% by the use of triploids?**)
Tidsskr. Frøavl 1947 : No. 417 : 172-74.

Triploidy is explained and trials with tetraploid sugar mangels and triploid mangels are recorded.

Twelve tetraploid families, obtained by colchicine treatment of the Danish sugar mangel Hvid Øtofte [White Øtofte], were tested against diploid Hvid Øtofte, and yielded 25% less dry matter than the diploid.

Triploids were obtained by crossing the white $4n$ strain with Gul Øtofte [Yellow Øtofte] and a few Barres strains. The percentage of triploids in the progeny could be determined, since all hybrids were coloured. In 1945, a trial was held of seven of the triploid progenies, using diploid Hvid Øtofte as control. These seven progenies comprised 82% of triploids, and these yielded on the average 16% more dry matter than the control, although one of the parents in four out of the seven cases was Barres. The four in question did, however, show a lower dry matter percentage than the other three progenies. The triploids were also larger and better developed than the diploid.

Attention is now being given to the production of triploid commercial seed, as triploids do not breed true for their valuable characteristics and hybridization must be employed. Difficulties in conducting the official strain trials of triploids are to be anticipated.

1225. BERKNER. 633.416.00.14
Eine "Studie" zu einem Rübensortenversuch. (**An introductory study to trials with mangels**).
Pflanzenbau 1940 : 16 : 430-34, 458-66.

Fifteen varieties of mangel were studied in demonstration experiments, with reference to (1) root yield, (2) root yield compared with leaf yield, (3) dry matter and sugar content, and (4) dry matter and sugar yield. The results are given in tables.

Incidentally it is mentioned that two varieties of mangel which may have identical contents of dry matter and of sugar need not be of equal value as fodder, since the vitamin contents may differ. E. W.

1226. BERGGREN, A. T. and
VIK, K. 633.42-2.412.5-1.521.6(48.1)
Forsøk med ulike rotvekstslag på klumprotsmitten jord. (**Trials with different root crops on club root infected soil**).
Meld. Norg. LandbrHøgsk. 1943 : 23 : 146-68.

Club root resistant varieties of turnips in Norway, England, Denmark and Sweden are referred to, the origin and outstanding performance of the Norwegian variety, Kvit Mai, being specially mentioned.

Resistance trials of turnips and swedes, including Kvit Mai and the hybrids Pedigree Bortfelder x Mai rape and Kvit Mai x Østersundom, were conducted on Norwegian farms in 1933-38, with the immune mangel Barres as a control.

The strains tested were found to differ greatly in resistance. The Kvit Mai turnip averaged 83% of healthy roots and only 3% of the plants were completely destroyed. The corresponding figures for Immuna were 82% and 9%, and for the Bortfelder turnips, 54% and 25%, while for the two varieties of swedes, Østøgt and Bangholm Olsgaard VII, the figures were 71 and 9, and 54 and 18 respectively.

1227. KILLINGER, C. B. and
STOKES, W. E. 633.49(75.9)
Chufas in Florida.
Bull. Fla Agric. Exp. Sta. 1946 : No. 419 : Pp. 16.

A general account is given of the chufa (*Cyperus esculentus* L.). The small sweet tubers produced by the plant can be used for both human and animal consumption. In addition, the grass-like tops are suitable for grazing. Spacing and fertilizer experiments are also described.

1228. 633.491(43.7)
La pomme de terre en Tchécoslovaquie. (**The potato in Czechoslovakia**).
La Pomme de Terre Française 1946 : 9 : No. 86 : 14-16.

In this summary of a report prepared by a French agricultural delegation to Czechoslovakia, short notes are presented on the following Czechoslovak varieties: Triumph, Eerstelingen, Kitting, Cardinal, Dagmar, Director Figna, Kotnov, Krassava, Martha, Karat, Bojar and some unnamed hybrids.

1229. 633.491(48.9)
Potatoes from Denmark.
Potato Export Cttee Minist. Agric. in collaboration with Agric. Coun.
Denmark (undated) Pp. 45.

Descriptions, coloured plates, and notes on synonymy, genetic origin and disease resistance are presented of the following potato varieties grown in Denmark: Ackersegen, Alma, Alpha, Athene, Bintje, Birgitta, Deodara, Duke of York, Juli, King Edward, Majestic, Royal Kidney, Sharpe's Express, Sharpe's Victor, Tylstrup Odin, Up to Date and Voran.

1230. REESTMAN, A. J.,
EEKELN, M. VAN,
FONTEIN, H. and
HENDRIKS, T. F. 633.491:577.16
Het ascorbinezuurgehalte van de nederlandsche aardappellrasen.
(**The ascorbic acid content of the Dutch varieties of potatoes**).
Landbouwk. Tijdschr. 1943 : 55 : 574-98.

Ascorbic acid content was investigated in unpeeled, steamed potatoes, with reference to possible variations due to varietal differences, stage of development and time of maturity. Green lifted, very early varieties may be very rich in ascorbic acid.

Freshly lifted potatoes contain practically no dehydroascorbic acid.

1231. LeCLERG, E. L. 633.491:581.192
Association of specific gravity with dry-matter content and weight of Irish potato tubers.
 Amer. Potato J. 1947 : 24 : 6-9.

In an analysis of tubers of the Houma and Green Mountain potato varieties grown in two different states, the linear correlation coefficients between specific gravity and dry matter content varied from + 0.81 to + 0.85. Soil and climatic conditions did not have a material effect upon the relationship between specific gravity and dry matter. Neither specific gravity nor dry matter content was significantly correlated with weight of tuber.

1232. TOTTINGHAM, W. E.,
 NAGY, R.,
 ROSS, A. F.,
 MAREK, J. W. and
 CLAGETT, C. O. 633.491:581.6(73)
Blackening indices of potatoes grown under various conditions of field culture.
 J. Agric. Res. 1947 : 74 : 145-64.

An account is given of nine years' trials on the incidence of blackening after cooking American potato varieties. Both environmental conditions and variety are concerned in blackening, but so far it has not proved possible to ascertain the precise environmental factors involved. Blackening occurs least frequently in the varieties Triumph, Chippewa and Sebago.

1233. LUNDEN, A. P. 633.491:582:578.088(48.1)
 633.491:575(48.1)
Synonymer i potetavlén. (Synonyms in potato growing).
 Meld. Norg. LandbrHøgsk. 1945 : 25 : 101-39.

The writer defines synonyms as varieties identical in genotype and consequently also in morphological and physiological characters. Genetic purity and the identification of varieties which closely resemble each other is discussed. The position in regard to synonym and variety testing in England, Scotland, Germany and Sweden is mentioned, with reference to the production of so-called "new" varieties by renaming varieties derived from plants selected by growers from older forms. Other ways in which synonyms may arise are also exemplified.

A systematic survey of varieties is needed in Norway, where some trials have already been conducted on synonyms and mixtures of varieties. The requisite methods for such comparative trials are described with remarks on the treatment of mutations, bolters and wildings in making a survey of synonyms. Particular care must be taken in regard to seed potatoes.

Two synonymous pairs of varieties, Forus and Kerr's Pink, and Roald and Ås, which have arisen as a result of breeders' operations, are described in detail.

1234. Riktsortlista över önskvärda matpotatissorter uppgjord av Sveriges Potatisodlares Riksförbund år 1947. (A guide list of varieties of desirable table potatoes, drawn up by the National Union of Swedish Potato Growers, 1947).
 Lantmannen 1947 : 31 : 157-58.

HAGBERTH, M. O.
 Potatisodlareförbundets lista över matpotatissorter. (Potato Growers' Union's list of table varieties of potato).
 Ibid. 1947 : 31 : p. 226.

As in other countries, there has been much confusion in the past in the naming of potato varieties in Sweden, and this has reacted in some cases on authenticity and purity of varieties. The elimination of synonyms and undesirable varieties was essential and the list here cited is intended as an aid in the work in progress to improve the quality of the varieties grown for the Swedish market.

1235. PETERSSON, G. and
FREDRIKSSON, L. 633.491-1.557:578.08(48.5)
Potatisutsädet's klyvning. (**Cutting of seed potatoes**).
Lantmannen 1947 : 31 : 147-49, 157.

This paper gives the results of experiments with whole and cut seed potatoes and the varietal differences in the yield obtained from cut tubers.

1236. DARPOUX, H. 633.491-2.411.4-1.521.6 (44)
Le mildiou de la pomme de terre—son traitement. (**Potato blight—its treatment**).
La Pomme de Terre Française 1947 : 10 : No. 90 : 5-8.

Notes on the varietal resistance of French potatoes are included.

1237. BOCZKOWSKA, and
GRISON, P. 633.491-2.7-1.521.6
Vitesse de destruction des pousses de pommes de terre de différentes variétés par les insectes printaniers du doryphore. (**Speed of destruction of different varieties of potato shoots by the spring batch of Colorado beetles**).
C.R. Acad. Agric. Fr. 1943 : 29 : 333-34.

Varietal differences in the susceptibility of potatoes to infestation in spring by the Colorado beetle are noted. The varieties Marszalek and Sobieszynkie proved most resistant. A note by Count Delamarre de Monchaux follows.

1238. 633.491-2.7-1.521.6(71)
Vers une pomme de terre résistante aux pucerons. (**Towards a potato resistant to aphids**).
La Pomme de Terre Française 1946 : 9 : No. 85 : 3-6.

A summary in French is presented of a paper by Adams, on aphid resistance in the cultivated potato and other *Solanum* spp. (cf. *Plant Breeding Abstracts*, Vol. XV, Abst. 1317).

1239. STELZNER, G. and
SCHWALB, H. 633.491-2.8-1.521.6
Die Virusanfälligkeit von *Solanum demissum*-Herkünften. (**The susceptibility to viruses of *S. demissum* samples of various origins**).
Züchter 1943 : 15 : 187-90.

Amongst six samples of *S. demissum* which were tested, the especially marked susceptibility of *S. demissum* var. Rio Frio to attack by virus A was noted. The attack was so severe as to prove lethal sometimes. Further study showed this plant to be suitable for use in detecting virus A in potato stands. The effect of virus Y had been tested by Hofferbert, who found that symptoms seldom developed after inoculation with virus Y, whereas the author's work showed infection to occur regularly. The authors consider this difference may be due to the use of different strains of virus Y. E. W.

1240. OPITZ, K. 633.491-2.8-1.521.6(43)
Weitere Versuche über den durch Viruskrankheiten herbeigeführten Abbau der Kartoffel. (**Further experiments on degeneration of the potato caused by virus diseases**).
Pflanzenbau 1940 : 16 : 323-42.

From results of experiments from 1937-1939, the resistance to degeneration of the varieties of potatoes used was classified as follows: Ackersegen, Jubel and Daber, fairly resistant; Industrie, Robinia, Estimata and Priska, less resistant; and Weltwunder [World Wonder], least resistant. Taking into account work dating from 1931, the resistance to degeneration of all the varieties studied gave the following sequence: Feuergold [Fire Gold], resistant; Ackersegen, Konsuragis, Jubel and Daber, fairly resistant; Industrie, Ovalgelbe [Oval yellow], Rotweissragis [Red White Ragis], Stärkereiche [Rich in Starch], Sickingen, Voran, Robinia, Estimata and Priska, less resistant; and Goldwährung [Golden Standard] and Weltwunder, susceptible.

The results give no criterion for the value of these varieties as crops in the sound condition, and susceptibility to infection is no test of yield when the crop is sound. It is noteworthy that Jubel, already proved resistant to wart and scab, has also proved resistant to virus diseases; moreover its yield has been greatly improved by new strains. E. W.

1241. LOCKE, S. B. 633.491-2.8-1.521.6(79.7)
Field resistance to leafroll infection in potato varieties.
 Phytopathology 1947 : 37 : p. 14. (Abst.).

In field tests of varietal and seedling resistance to leaf-roll carried out in Washington State during 1944 and 1945, Katahdin and Sequoia showed the highest degree of resistance, while Netted Gem, Chippewa and Burbank were the most susceptible varieties.

1242. STELZNER, G. and SCHWALB, H. 633.491-2.8-1.521.6:578.08
 Reaktion einer Reihe von Solanaceen auf Infektion mit A-, Y- und X-Virus der Kartoffel unter Berücksichtigung ihrer Brauchbarkeit als Testpflanze. (**Reaction of a series of Solanaceae to infection with A, Y and X virus of potato, with reference to their use as test plants**).
 Phytopath. Z. 1942 : 14 : 497-511.

Sixty-eight species of Solanaceae were tested for symptoms after exposure to infection by A, Y and X viruses of potato, the main object being to find suitable test plants for the virus A which would act as indicators throughout the year.

Nicotiana glauca, *N. glauca* and *N. longiflora* proved to be certain and decisive indicators of attack by the virus A and also showed clear symptoms with the Y and the X viruses of potato. E. W.

1243. 633.491.00.14(44)
 Premières observations sur les variétés étrangères cultivées en 1946.
 (**First observations on the foreign varieties grown in 1946**).
 La Pomme de Terre Française 1947 : 10 : No. 90 : 10-13.

Notes are presented on the characteristics, behaviour and disease resistance of a series of English, Dutch, Danish and Czechoslovak potato varieties recently introduced into France.

1244. LUNDEN, A. P. 633.491.00.14(48.1)
 Forsøk med tidligpotetsorter 1933-40. (**Trials with early varieties of potatoes 1933-40**).
 Meld. Norg. LandbrHøgsk. 1942 : 22 : 57-82; also 50. Årsmeld. Norges LandbrHøgsk. Åkervekstforsøk 1942 : 55-79.

Full particulars are given of trials in Norway of some well known varieties of potatoes, including Immun Keiserkrone, Dukker, Grønne Groer, Marius and Juli. The origin, performance and characteristics, including disease resistance, are recorded.

FIBRES 633.5

1245. BARKER, H. E. and BERKLEY, E. E. 633.51:581.6(73)
Fiber and spinning properties of cotton, with special reference to varietal and environmental effects.
 Tech. Bull. U.S. Dep. Agric. 1946 : No. 931 : Pp. 36.

An analysis was made of the fibre and spinning properties of commercial cotton varieties and strains grown under irrigated and non-irrigated conditions in the Cotton Belt; the chief conclusion reached is that variety is a more important factor than the environment in its effect upon fibre qualities and spinning performance.

1246.

GRANHALL, I.

633.52:575(48.5)

633.522:575(48.5)

Spånadsväxternas odling och förädling. (**Cultivation and breeding of textile plants**).

Årsb. Jordbruksforskning, Stockholm 1946 : 69-80.

Past and present successes and the future requirements in Sweden with regard to flax and hemp cultivation, breeding and processing are outlined against the economic background. In 1938, flax breeding was again taken up with energy at Svalöf, where the collection of breeding material includes flaxes from various European countries and the best foreign and indigenous flaxes, and where the newest breeding techniques have been used.

The first result of this work was the release for multiplication by the General Swedish Seed Co. of two new flaxes for spinning. One of these, Sv 015b₁, was derived by line selection from a sister variety of Blenda I. In 1944, it surpassed the latter by 11.1%, and Herkules by 5.7%, in yield of straw. The other new line, Sv 0220, from a cross between two older Svalöf lines, 036 and 061, is of the Herkules type, but with much stiffer straw; in 1940-44 its yield exceeded Herkules by 7.0%.

Two other noteworthy lines are Sv 0302, which is remarkably stiff strawed, and Sv 0800, an X-ray mutant with yellowish green leaf and stem and superior to its parent for cultivation. Sv 0800 averaged 6% more straw in 1944 and 1945 than Concurrent, which it approximately equalled in seed yield.

Though mutation breeding of flax is turning out quite well, work with flax polyploids has been less successful: the tetraploid spinning varieties are later, weaker, shorter, and poorer in fibre than the normal diploid parents.

Sweden's hemp breeding problem is discussed with observations on the types of material there available for breeding purposes, the northern and southern European types and the intermediate form, represented by the German varieties, Schurig and Kuhnów, which with a few Latvian, Hungarian and North American hems are the only real unmixed varieties available for breeding. After some years of breeding the difference between the northern and southern types became less marked.

Much attention has been devoted to effects of length of day and even the very uniform variety Schurig was found to yield earlier types when grown in two localities in Norrland; but both the new types are inferior to the Schurig long grown at Svalöf, in both length and yield of stems.

Desirable sexual types are being sought and some strains comprising hermaphrodites are under observation and are being selected.

Results seem promising as regards plant height and fibre quality; seed production in the new type presents difficulties.

Future prospects in hemp cultivation in Sweden are mentioned.

1247. GRANHALL, I.

633.52:575(48.5)

Lindag på Svalöf den 22 juli 1946. (**Flax Day at Svalöf on 22 July 1946**).

Sverig. Utsädesfören, Tidskr. 1946 : 56 : 617-18.

This meeting was held to study the results so far obtained in flax breeding and the work of the flax laboratory.

The importance of varietal purity was stressed, and two new selections, Sv 0220 and Sv 0302, were exhibited in the demonstration plots. These flaxes are more resistant than existing varieties to lodging after heavy rain.

1248. STOA, T. E.

633.52:575(76.4)

Dakota—a new flax.

Bi-m. Bull. N. Dak. Agric. Exp. Sta. 1946 : 9 : No. 2 : p. 53.

The release of the new Dakota flax variety is reported. Dakota originates from a cross between the rust resistant Renew variety and Bison. It is highly resistant to wilt, and is resistant to all the races of rust known in North Dakota. It is less susceptible to pasmo than most other rust resistant varieties. The new variety has yielded satisfactorily, and ripens at about the same time as Bison; in oil content it is slightly lower than Bison, but it is superior in iodine number.

1249. ROTHMALER, W. 633.52:582(46.9)
 Sôbre a sistemática e a sociologia dos linhos de Portugal. (**The system-
 atics and synecology of the flaxes of Portugal**).
 Agron. Lusitana 1944 : 6 : 253-79.

A taxonomic revision is presented of the wild and cultivated forms of flax found in Portugal. Notes are added on the origin of flax cultivation, the possible breeding value of the wild species, and the ecological associations in which flax species occur.

1250. KOMMEDAHL, T. and
 CHRISTENSEN, J. J. 633.52-2.484-1.521.6
Late wilt of flax.
 Phytopathology 1947 : 37 : p. 13. (Abst.).

Several thousand varieties and lines of flax have been tested during the last ten years for resistance to *Fusarium Lini*. Varieties differing widely in susceptibility were also found to differ in time of wilting. Newland and Punjab, for instance, tend to wilt in the seedling stage; Linota and C.I. 423 tend to wilt late in the season; other varieties, such as Pale Pink, Redwing and Crystal, show variability in the time of wilting. In general, progenies involving Newland tend to wilt early, while progenies involving C.L. 143 tend to wilt late in the season. These tendencies, probably genetic, are influenced by environmental factors, particularly temperature. The importance of the fact that varieties wilt at different times is emphasized when making varietal and genetical investigations.

1251. SPANGENBERG, J. 633.52.00.14(89)
 Ensayos de linos de fibra en el Uruguay. Resultados obtenidos.
 (**Trials of fibre flax in Uruguay. Results obtained**).
 Rev. Fac. Agron. Univ. Montevideo 1944 : No. 37 : 83-151.

Extensive details are given of the fibre and seed yield, and resistance to *Septoria linicola* and *Melampsora Lini* of the fibre flax varieties introduced into Uruguay.

1252. EDWARDS, H. T. 633.526.1-1.524(72)
**The introduction of abacá (manila hemp) into the western hemi-
 sphere.**
 Rep. Smithson. Instn 1945 (1946) : Publ. 3817 : 327-49.

An historical account is given of the work on the introduction of abacá into the western hemisphere, which made possible the large commercial plantings in Panama during the Second World War.

1253. RILEY, H. P. 633.526.2:576.354.4:575.127.5
Chromosome studies in a hybrid between *Gasteria* and *Aloe*.
 Genetics 1947 : 32 : p. 102. (Abst.).

An investigation of microsporogenesis in an intergeneric hybrid between *Gasteria* and *Aloe* is reported.

SUGAR PLANTS 633.6

1254. EMMEREZ DE CHARMOY, D. D' 633.61:575(69.81)
 La Station de Sélection des Cannes à Sucre de la Réunion. (**The Sugar
 Cane Breeding Station of Réunion**).
 Agron. Trop. 1946 : Nos 11-12 : 617-20.

An account is given of the work done by the Sugar Cane Breeding Station at La Bretagne, Réunion. The breeding objective has been the production of locally adapted varieties resistant to disease; to this end, the best local material has been utilized, foreign varieties have been introduced and acclimatized, and new varieties have been created by hybridization and selection.

1255. ARTSCHWAGER, E. 633.63:581.466:581.162.5
**Pollen degeneration in male-sterile sugar beets with special
 reference to the tapetal plasmodium.**
 Amer. J. Bot. Suppl. 1946 : 33 : p. 817. (Abst.).

A description is given of the cytological phenomena accompanying degeneration of the pollen within the anthers of male sterile sugar beets.

1256. BERTHAULT, P. 633.71(65)
L'amélioration du tabac et de sa culture en Kabylie. (The improve-
ment of tobacco and its cultivation in Kabylia).
C.R. Acad. Agric. Fr. 1946 : 32 : 775-79.

Notes are presented on the origin and characteristics of the tobacco varieties Spada, Chebli, Colon, Djendel, Cabot and Java-Isère, grown in Kabylia, Algeria.

1257. GISQUET, P.,
DUFRÉNOY, J. and
DUSSEAU, A. 633.71:575.127.2
Hybrides interspécifiques de *Nicotiana*. (Interspecific hybrids of
Nicotiana).
Scientia Genetica 1940 : 2 : 67-78.

The F_1 hybrid *N. Tabacum* var. *purpurea* x *N. sylvestris* was almost completely sterile, but a few seeds were obtained in 1924 and gave rise to a small F_2 population and succeeding generations up to F_{13} . Descriptions are given of the two species and of the hybrids. The usual cytological irregularities were observed in the F_1 ; the F_2 , which consisted of 150 plants, showed great diversity in form, habit, time of maturity, etc., and many floral and other anomalies were observed. The degree of fertility varied from almost normal to nil, and from 80 individuals showing some fertility an F_3 population was obtained. The fertility increased with each successive generation, there being at the same time a tendency to approach the *N. Tabacum* type; certain characters of the other species were, however, retained and at least one new fertile type of *N. Tabacum* was obtained.

1258. 633.71:575.127.2:576.356.5:581.02
633.71:575.127.2:576.356.5:581.039
633.71:575.129(45)
BARTOLUCCI, A.
Il fenomeno della poliploidia e il tabacco: 2ª nota—Nuove specie fertili
di tabacco prive o quasi di nicotina e loro caratteristiche morfologiche.
(The phenomenon of polyploidy and tobacco: 2nd note—New
fertile species of tobacco free or almost free of nicotine and their
morphological characteristics).
Bol. Tec. Tab. 1940 : 37 : 157-74.

In continuation of an earlier work (cf. *Plant Breeding Abstracts*, Vol. III, Abst. 697), the author reports the results of experiments designed to effect chromosome duplication in sterile interspecific hybrids which were characterized by nicotine content lower than that of either of the parents. Seeds of eight hybrids, all combinations of *Nicotiana Tabacum* with *N. glauca* or *N. sylvestris*, were subject to centrifuging, and from 5500 seeds treated 514 plants were obtained, of which five proved to be polyploid and bore fertile capsules. The F_2 generations from these five plants were studied and two of them, *N. Tabacum* var. *brasile* x *N. sylvestris* and *N. Tabacum* var. *Xanty-yaka* x *N. sylvestris*, proved promising in having a favourable combination of the characters of the two parent species.

Colchicine treatment of 4152 F_1 seeds produced 12 plants with polyploid characteristics, and four promising plants were selected from their F_2 progenies. Though the polyploid plants bred true on the whole, some of the progenies showed variations in such characters as leaf form and flower colour. In all of them, nicotine was present either in very small quantities or was absent altogether. Their leaves will therefore be subjected to curing tests to investigate the possibility of preparing from them a product of low nicotine content, but otherwise having properties similar to those of ordinary tobacco.

The two amphidiploid species obtained by centrifuging have been named *N. dibrasilsyl* and *N. dixansyl*, and those from colchicine *N. diavansyl*, *N. dimacrosyl*, *N. dibrasilglau* and *N. dimacroglaui*. Full descriptions are given of the six new species.

1259. 633.71:575.242:581.6
633.71-1.557:575(45)
PERUCCI, E.
Una varietà italiana di tabacco di grande reddito Kentucky "Perucci."
(A high yielding Italian tobacco Kentucky Perucci).
Tabacco 1947 : 51 : No. 750 : 9-18.

The form in question arose as a mutation, which bred true for its special characteristics. It

is distinguished from ordinary Kentucky by having larger leaves with white ribs and very attenuated secondary veins, a deep and very abundant root system, a higher germinative energy than Kentucky and more rapid early development; the leaves mature 10–15 days earlier, and the plant is more resistant to drought and to *Thielaviopsis basicola*. Owing to the greater width of the leaves, the yield is higher and has, under favourable conditions, amounted to as much as 4 kg. of fresh weight per plant; it responds more favourably to intensive conditions of cultivation but also under less favourable conditions yields better than the ordinary form. In official quality tests the product has been assigned the maximum number of points; it has the low nicotine content of 3.50%. Even the lowest leaves growing just above the ground are so large and of such fine texture that they can be cured and used for cigarette tobacco.

The best methods of cultivation and curing are described. The new variety dries and cures more quickly than the original Kentucky.

1260. SMITH, T. E. 633.71-2-1.521.6:575(75.6)

The problem in tobacco breeding work.

Res. Fmg, N.C. 1946 : Progr. Rep. No. 1 : 5 : 1-2.

The problems of black root rot (*Thielaviopsis basicola*), black shank (*Phytophthora parasitica* var. *Nicotianae*), and Granville wilt (*Bacterium solanacearum*) in North Carolina are discussed, with reference to recently developed tobacco varieties which are each resistant to one of these diseases. Breeding to produce varieties resistant to more than one disease is in progress.

1261. TEMME, J. 633.71-2.3:576.16

Natrot bij tabak (*Nicotiana Tabacum*). [Wet rot in tobacco (*N. Tabacum*)].

Tijdschr. PlZiekt. 1943 : 49 : 113-16.

This study of a bacterial pathogen termed "strain 1" infecting tobacco, led to the conclusion that it was a new species of *Erwinia* for which the name *E. nicotianae* is proposed.

1262. CLAYTON, E. E. 633.71-2.3-1.521.6:575.127.2

Transfer of wildfire resistance from *Nicotiana longiflora* to *N. tabacum*.

Phytopathology 1947 : 37 : 4-5. (Abst.).

A selection of *N. longiflora* was observed to be immune to *Phytophthora tabaci*. After prolonged attempts to cross this species with cultivated tobacco, a cross was successfully made in 1940. Tetraploidy was not involved, and the F_1 of the first back-cross to tobacco was self and cross fertile. An F_8 selection designated T.I. 106, possessing the wildfire immunity of *N. longiflora*, was crossed with commercial tobacco varieties. The F_1 hybrids showed the resistance of T.I. 106; the resistance of this species thus appears to be dominant. The F_1 hybrids also showed marked heterosis. T.I. 106 has in addition been found resistant to inoculations of blackfire (*Ph. angulata*).

1263. DIACHUN, S. and

VALLEAU, W. D.

633.71-2.8-1.521.6

Reaction of 35 species of *Nicotiana* to tobacco-streak virus.

Phytopathology 1947 : 37 : p. 7. (Abst.).

No *N. Tabacum* varieties appear to possess sufficient resistance to tobacco streak virus to be valuable in breeding. The reaction of 35 other species of *Nicotiana* ranges from extreme susceptibility to a high degree of resistance. *N. glauca* and *N. Gossii* appeared to be sufficiently resistant for breeding purposes.

1264. SMITS, C.

633.71.00.14(49.2)

De verbouw van tabak in Nederland. (Tobacco growing in Holland).

Tijdschr. ned. Heidemaatsch. 1941 : 53 : 144-58.

The possibility of developing tobacco growing in Holland, which has decreased greatly since prices fell, is examined. To compete with the product from the Dutch East Indies the quality of the leaf and its curing must be satisfactory.

A preliminary investigation is in progress by the Nederlandsche Heidemaatschappij (the Moorland Reclamation Co.) to ascertain: (1) whether there is a good type of tobacco

available in the country; (2) whether foreign varieties can provide a type suitable for Holland; and (3) whether manuring and curing methods are satisfactory.

An experimental plot has been laid out on a grower's land near Rhenen with seed from ten varieties, obtained from growers in various parts of the country, and with seed from types of tobacco grown in Canada, South Africa, Argentina, Brazil, Bulgaria, the Philippines, Germany, Japan and the Straits Settlements. As a result of this test, in 1938 further sowings were made of two Dutch, two Canadian, three South African, one Philippine, two Argentine, and four German types. In 1939 and 1940, the trial was continued with two Dutch, two Canadian, one German and one Philippine type. The Philippine and German types and one Dutch type, which included both Burley and Havanna varieties, were remarkable for good leaf shape and size as well as burning capacity and quality (fragrance). The quality could be improved by manuring.

Most of the Dutch varieties produce inferior tobacco and future trials will comprise the varieties named above only.

Cultural methods and their effect on quality are also being examined, and the origin of tobacco and the species and varieties are also briefly discussed.

1265. BOTTI, G. 633.71.00.15:061.6(45)
I problemi del tabacco e l'opera dell'Istituto Scientifico Sperimentale per i Tabacchi. (**The problems of tobacco and the work of the Scientific Research Institute for Tobacco**).

Tabacco 1947 : 51 : No. 570 : 19-22.

The new plans upon which the Italian national tobacco research institute is being organized are outlined. Existing research at recognized stations such as that at Scafati will continue, one of the lines of activity being to restore the quality of Italian tobaccos by selection and breeding work, and to produce disease resistant forms. Certain special problems which are met with from time to time, will be delegated to recognized specialist research institutes such as those already existing in Italy for such subjects as ecology, plant pathology, bacteriology and manuring.

1266. KRUG, C. A. 633.73:575(81)
Un clone tétraploïde du *Coffea excelsa* à haut rendement. (**A tetraploid clone of *C. excelsa* with a high yield**).
Rev. Bot. Appl. 1946 : 26 : p. 578.

A French summary is presented of a Portuguese paper on coffee breeding already reviewed in *Plant Breeding Abstracts* (cf. Vol. XVI, Abst. 1854).

1267. KRUG, C. A. and CARVALHO, A. 633.73:581.4:575.11
Genética de *Coffea*. VIII—Hereditariedade dos caracteres de *C. arabica* L. var. *anomala* K.M.C. (**Genetics of *Coffea*. VIII—The mode of inheritance of the characters of *C. arabica* L. var. *anomala* K.M.C.**).

Bragantia, São Paulo 1945 : 5 : 781-91.

A recessive gene *an* characterizing var. *anomala* of *C. arabica* is described. It determines abundant branching, short internodes with a tendency toward fasciation, deformed leaves, irregular flowers and abnormal fruits and seeds. Gene *an* is almost but not completely recessive when var. *anomala* is crossed with the typical form of the species.

1268. HENDRICKX, F. L. and LEFEVRE, P. C. 633.73-2-1.521.6(67.5)
Observations préliminaires sur la résistance de lignées de *Coffea arabica* L. à quelques ennemis. (**Preliminary observations on the resistance of lines of *C. arabica* L. to some pests**).

Bull. Agric. Congo. Belge 1946 : 37 : 783-800.

Tables are given showing the resistance of lines of the *C. arabica* varieties Local Bronze, Mibirizi, Bourbon, Bourbon Mayagese, Mysore, Kabare, Blue Mountain Jamaïque, Blue Mountain Kenya and Jackson to *Colletotrichum coffeanum*, *Cercospora coffeicola*, *Botrytis cinerea*, die-back, *Dasus simplex*, *Systates* spp. and *Antestia* sp.

1269. MÜNTZING, A. 633.74:581.162.5(86)
633.74:581.162.3(86)
Some observations on pollination and fruit setting in Ecuadorian cacao.
Hereditas, Lund 1947 : 33 : 397-404.

Investigations are reported on cacao trees on the Swedish hacienda Clementina near Balahoyo, Ecuador. It is thought most probable that the trees arose from hybridization between the Ecuadorian variety Nacional and trees raised from Venezuelan material. Three of the trees examined proved to be self-incompatible; one was self-compatible. Four combinations of different self-compatible trees were fertile; one combination was sterile. A correlation was observed between fruit set and the presence of aphids. The comparatively poor fruit set appeared to be due largely to incomplete pollination.

OIL PLANTS 633.85

1270. LANGHAM, D. G. 633.853.74:575.116.4
Initiation of a linkage map for sesame (*Sesamum indicum* L.)
Genetics 1947 : 32 : p. 94. (Abst.).

It is reported that data have been obtained for the preliminary mapping of more than 100 genes in *S. indicum* L.

1271. LANGHAM, D. G. 633.853.74:581.143.7:575.11
Seedling characters in sesame (*Sesamum indicum* L.).
Genetics 1947 : 32 : p. 94. (Abst.).

Many differences have been observed among seedlings of *S. indicum* L.; only a few of the characters, however, show a sufficiently definite segregation to be useful in genetical investigations. Characters previously studied include glabrous leaves, cupped leaves, and absence of glands on the dorsal leaf surface (cf. *Plant Breeding Abstracts*, Vol. XVI, Absts. 1369-70). In addition, the following characters are reported: purple, green and yellow bud; albino, tilted cotyledons; white, purple and green stem; and three types of virescence. Most of these characters are conditioned by single gene differences. The character of purple bud, however, is differentiated from green bud by the action of complementary genes, one of which is linked with a gene for a virescent type.

1272. ENGELBEEN, M. 633.854.56:575
Les *Aleurites*. (**The species of *Aleurites***).
Bull. Agric. Congo Belge 1946 : 37 : 255-342.

In this general review of the cultivation and utilization of *Aleurites* spp., accounts are given of the taxonomy of the genus, of the principal varieties of *A. Fordii* and *A. montana*, and of the floral biology, origin, present distribution, and breeding work connected with the latter two species. Selection has been mainly devoted to raising the oil yields of the plantations, increasing resistance to frost, and developing forms with a convenient branching habit. Hybridization experiments have also been effected.

1273. LAZARO, R. 633.854.78:581.04:576.356.5
Efectos de colchicina en *Helianthus annuus*. (**Effect of colchicine in *H. annuus***).
Rev. Fac. Agron. Univ. Montevideo 1943 : No. 32 : 163-68.

After treating the sunflower Selection A from La Estanzuela with colchicine, plants were obtained with some of the morphological characters usual in polyploids, but the offspring of these plants had the diploid chromosome number.

TANNING PLANTS 633.87

1274. ANDERSSON, G. 633.87:575(48.5)
Ny förädlingsgren. (**A new sphere in plant breeding**).
Sverig. Utsädesfören. Tidskr. 1947 : 57 : p. 70.

The Tannin Co. at Västervik has placed 2000 kr. at the disposal of the Swedish Seed Association for research and breeding of the tannin plant *Rumex hymenosepala*.

MEDICINAL PLANTS 633.88

1275. STUHR, E. T. 633.88(73)
The distribution, abundance and uses of wild drug plants in Oregon and Southern California.
 Econ. Bot. 1947 : 1 : 57-68.

The results of a survey of the wild medicinal plants growing in Oregon and Southern California are listed.

1276. POPENOE, W. 633.885.1(72.81)
 Cultivo de la quina [cinchona] en Guatemala. [The cultivation of **quinine (cinchona) in Guatemala**].
 Rev. Fac. Nac. Agron. Colombia 1942 : 4-5 : No. 18 : 314-32.

Reference is made to the cinchona types of Guatemala and to the variation that they exhibit.

RUBBER PLANTS 633.91

1277. PERRY, E. L. 633.913(79.4)
Growing rubber in California.
 Rep. Smithson. Instn 1945 (1946) : Publ. 3817 : 351-62.

An account is given of past and present investigations on guayule cultivation in California; the research work now in progress includes breeding.

1278. ROLLINS, R. C. 633.913:575.113.7
The occurrence of sublethal dwarfed hybrids in *Parthenium* and their chimeric mutation to normalcy.
 Amer. J. Bot. Suppl. 1946 : 33 : p. 825. (Abst.).

Approximately one half of the F_1 progenies of a reciprocal cross between *P. argentatum* and *P. tomentosum* var. *Stramonium* were sublethal dwarfs; the other half was normal. Two of the dwarfs gave rise to normal branches. The dwarfs did not differ from the normal hybrids in their chromosome complement.

1279. GARDNER, E. J. 633.913:581.162.32
Insect pollination in guayule, *Parthenium argentatum* Gray.
 J. Amer. Soc. Agron. 1947 : 39 : 224-33. .

Field and greenhouse studies have demonstrated that various insect carriers may effect cross-pollination in guayule.

1280. ROLLINS, R. C. 633.913:582
Can populations of plants showing the combined effects of polyploidy, interspecific hybridization, sexuality, and facultative apomixis be usefully organized into systematic entities?
 Amer. J. Bot. Suppl. 1946 : 33 : p. 843. (Abst.).

The complex intraspecific variability of *Parthenium argentatum* and *P. incanum* and the considerable degree of hybridization between them render valueless any subdivision of these species into traditional taxonomic categories.

FRUITS AND NUTS 634 .

1281. HANSEN, N. 634:007.575(73)
Breeding hardy fruits for northwest prairie.
 Amer. Fruit Gr. 1947 : 67 : No. 7 : 12, 22, 31.

The author gives an account of his work on fruit breeding.

1282. 634:575(46.9)
 Relatório dos trabalhos realizados pelo Departamento de Pomologia da Estação Agronômica Nacional, durante 1945, e subsidiados pela Junta Nacional das Frutas. (Report of the work done by the Pomological Department of the National Agronomic Station during 1945, and subsidized by the National Fruit Board).
 Bol. Junta Nac. Frutas, Lisboa 1946 : 6 : 117-26.

Hybridization work on plums, peaches, apples, pears and olives is reported. The following peach combinations are mentioned: J. H. Hale x de Alcobaça, J. H. Hale x Amsden, J. H. Hale x Temporão de Alcobaça, J. H. Hale x Triumph, de Alcobaça x Early Elberta, Blanco

Rosa x Précoce de Hall and J. H. Hale x Précoce de Hall. Apple stocks have been crossed to study the mode of inheritance of resistance to woolly aphid. Attempts have been made to obtain polyploid fruit varieties by means of X-irradiation, heat shock treatment and colchicine.

Castanea sativa has been crossed with *C. crenata*

1283. WELLINGTON, R. 634:575(74.7)
Report on Geneva. New York Experiment Station has introduced 137 varieties.

Amer. Fruit Gr. 1947: 67: No. 7: 13, 24, 30-31.

Fruit breeding investigations carried out during the past 52 years at the New York State Agricultural Experiment Station are described.

1284. POPENOE, W. 634:575:631.524(7+8)
 El problema de la variedad en la horticultura tropical. (**The variety problem in tropical horticulture**).

Rev. Fac. Nac. Agron. Colombia 1942: 4-5: Nos 16-17: 157-65.

An outline is given of the principles involved in breeding and acclimatizing new varieties of fruits for tropical and subtropical conditions. Examples are quoted from the achievements of fruit breeders in California and Florida.

1285. SKARD, O. and VALLEVIK, G. 634-2.111-1.521.6(48.1)
 Skaden på frukttrea vinteren 1939/40. (**Damage done to fruit trees during the winter 1939/40**).

Meld. Norg. LandbrHøgsk. 1942: 22: 1-56.

The physiological causes of cold resistance are considered with records of winter injury to fruit trees from American, German, Swedish and Norwegian literature.

From the 1939/40 survey of winter damage in Norway, it appears that the Russian varieties of apples are the hardiest; the varieties from Sweden and Eastern Norway come next, followed by the Danish, German and then the English apples.

Both diploid and triploid apples suffered severe damage.

Pears and plums did not show great varietal differences in cold resistance, nor did sweet cherry varieties.

As regards manuring, it appeared that trees of normal growth were more hardy than overgrown types.

Results obtained with grafts on East Malling stocks and the effect of age and heavy bearing on cold resistance are considered.

1286. KUENEN, D. J. 634.1/2-2.7-1.521.6(49.2)
 Spint op vruchtboomen. (**Red spider on fruit trees**).
 Tijdschr. PlZiekt. 1943: 49: 130-31.

In continuation of the work of van der Plassche and of Bosma, experiments in progress have yielded the following results, which also include some of H. J. Hueck's findings.

Varieties differ in their resistance to the pest. In practice the amount of infection is mostly estimated by the degree of browning of the leaves. Apparently, however, browning is not always directly correlated with the numbers of red spiders present. Thickness of the leaf cuticle is an important factor, and the thicker the cuticle, as for example in the pear, the less likely is it that browning will occur. In the plum tree, cuticle thickness is directly related to the number of red spiders that occur on a particular variety.

Stock and climate also affect the incidence of red spiders.

1287. STUIVENBERG, J. H. M. VAN 634.1:581.163:577.17
 Parthenocarpie. (**Parthenocarp**).
 Vakbl. Biol. 1943: 24: 25-31.

The definitions of parthenocarp by various authorities are examined, together with the existing evidence on the condition when induced by a stimulus other than actual fertilization. The role of plant hormones in the production of parthenocarpic fruits is specially considered, and the work of the Dutch Laboratory for Horticulture (Laboratorium voor

Tuinbouwplantenteelt) on the effect of growth substances in the production of parthenocarpic apples and pears is reviewed. The possibilities of this technique in combating the effects of night frosts on fruit set are also mentioned.

1288.

634.11:007:575(73)

Peter Gideon and the Wealthy apple.

Amer. Fruit Gr. 1947 : 67 : No. 7 : 20, 40.

An account is given of the life and pioneer apple breeding work of Peter Gideon, who was born in Ohio in 1820.

1289.

634.11:576.16(71)

150th birthday of an old timer.

Amer. Fruit Gr. 1947 : 67 : No. 7 : 21, 40.

An historical account is presented of the McIntosh apple variety, discovered growing wild in 1796 by John McIntosh.

1290. BLASER, H. W. and

EINSET, J.

634.11:576.356.5:575.255

Leaf development in a periclinal chimera of "Spy" apple.

Amer. J. Bot. Suppl. 1946 : 33 : p. 818. (Abst.).

A description is given of the distribution of the diploid and tetraploid components of this chromosomal chimera in the stem apex, leaves and stipules.

1291. RODRIGUES, A.

634.13:581.47:581.48

Algumas relações entre o número de sementes, a forma e as dimensões dos frutos, em variedades culturais de pereiras. (**Some relations between the number of seeds, and the shape and dimensions of the fruits, in cultivated varieties of pears.**)

Agron. Lusitana 1945 : 7 : 121-57.

The shape and size of the fruits of the Triomphe de Jodoigne and William Duchesse pears vary with the number of seeds. In the former variety, seedless pears are reduced in size; a 50% increase in longitudinal section accompanies the formation of one seed, and a further 15% the formation of three seeds. In the latter variety seedless pears are the largest, the area of the longitudinal section decreasing when seeds are formed.

1292. SKARD, O. and

WEYDAHL, E.

634.22:581.6

Plommetørking. (**Prune drying**).

Meld. Norg. LandbrHøgsk. 1942 : 22 : 87-104.

Forty-two varieties of prunes and plums were compared with regard to suitability for drying, and the successful, small, medium and large varieties are enumerated. Dark coloured types gave better results than light coloured ones.

1293. GROSJEAN, J.

634.22-2.472.3-1.521.6:575.12(49.2)

Het vraagstuk van de loodglansziekte bij vruchtboomen. (**The problem of silver leaf in fruit trees**).

Tijdschr. PlZiekt. 1943 : 49 : 172-78.

Silver leaf, found on plums and peaches, and also to some extent on other fruit trees and bushes, is due to *Stereum purpureum*.

Strictly speaking, there are no physiological races of the fungus.

All the cultivated plums are more or less susceptible to the fungus, though some forms of *Prunus cerasifera* are rarely observed to be infected. Crosses might therefore be made to improve the quality and resistance of such types, if the difficulty, due to the different chromosome numbers of *P. cerasifera* and *P. domestica*, could be eliminated by the use of colchicine. Varietal crosses could also be tried, due care being given to proper methods of inoculation in testing the progeny for resistance.

The work that has been done on the causes of resistance in *Populus* spp. to *S. purpureum* and *Fomes pomaceus* has suggested direct methods of controlling silver leaf on plums by injections of bark extract into the stem of the trees. The inhibitory reaction has, however, not yet been explained.

The possibility of using the antagonistic action of other fungi should also be further examined. In this connexion, it appears that, although *S. purpureum* does not exhibit parasitic specialization, isolations from different sources are not identical. Genetical, chemical and mycological investigations are necessary in future work on the subject.

1294. FLORY, W. S. (jun.) 634.25(73)
The present situation with reference to new peach varieties.
 Va Fruit 1947 : 35 : 31-42.

The newer peach varieties grown in the United States are discussed. A table is included giving data on the flesh characteristics, adherence of the stone, season, and date of origin of approximately 100 varieties.

1295. MORETTINI, A. 634.25:575(45)
 Nuove varietà di peschi d'incrocio presentate alla settima mostra delle
 pesche di Verona. (**New varieties of hybrid peaches presented at
 the seventh peach show at Verona**).
 Ital. Agric. 1940 : 77 : 709-18.

Peach breeding was started at Florence in 1929, and varieties have now been attained which are superior in yield, more transportable and better in quality than those previously grown. Some of the best of the new hybrids are here described and illustrated. The variety Hale served as maternal parent in most of the crosses, and was pollinated with Carman, Trionfo Liscio, Fior di Maggio [Mayflower] and others. From the cross with Trionfo Liscio, two varieties have been produced, which resemble Hale in fruit quality but ripen 15 to 26 days sooner and so escape the damage from insects, such as *Cydia* and *Ceratitis*. From the cross with Fior di Maggio, several promising types have been produced, all with white flesh and all surpassing Hale in earliness in varying degrees.

The new varieties have received prizes for quality at the Verona show, and although produced for the Florence area, are now being tried in many other localities too.

1296. DETJEN, L. R. 634.25:581.162.3
**Fruitfulness in peaches and its relationship to morphology and
 physiology of pollen grains.**
 Bull. Univ. Del. Agric. Exp. Sta. 1945 : No. 257 : (Tech. No. 34) : Pp. 24.

Pollination and fruit set were investigated in 37 varieties of peach during a four year period. All the varieties studied proved to be self-fertile with the exception of Candoka, Chinese Cling, J. H. Hale and June Elberta.

The results of bagging experiments indicated that self-pollination in bagged flowers is not as effective as open-pollination. A yield representing a commercial crop was, however, obtained by the bagging method. When bagged flowers were artificially pollinated by brushing, the set of fruit was slightly higher than in open-pollinated blossoms.

The effect of shade from the bags upon the set of fruit was also studied.

Differences in the effect of different pollen varieties upon the fruit set appeared to be due, in all probability, to variability among the fruiting trees rather than to differences between the pollen parents.

The pollen grains of the varieties studied were found to differ in both their physiology and morphology. It is suggested that the variability in pollen size should prove useful in varietal identification.

1297. TRÍAS, A. 634.3.00.14(89)
 El problema citrícola en el país. (**The problem of growing citrus
 fruits in our country**).
 Rev. Fac. Agron. Univ. Montevideo 1941 : No. 24 : 67-85.

Data are presented on the yield, quality and flowering date of a series of citrus fruit varieties on trial at the Salto Experimental Station in Uruguay.

1298. LEES, P. M.,
 BERGERET, G. and
 ETCHANDY, A. M. 634.31:581.6(89)
 634.322:581.6(89)
 Observaciones sobre frutas cítricas de la región de San Antonio Dep. del Salto de la cosecha de 1940 y 1942 conservadas en cámara frigorífica. (**Observations on citrus fruits from the region of San Antonio, Department of Salto, from the harvests of 1940 and 1942 after cold storage**).

Rev. Fac. Agron. Univ. Montevideo 1943 : No. 34 : 159-93.

The quality of a series of orange and mandarin varieties has been ascertained after cold storage.

1299. ETCHANDY, A. M. 634.334:581.6(89)
 Estudio sobre el limón (*Citrus Limonum*, Risso). Su conservación frigorífica y su industrialización. [**Study on the lemon (*C. Limonum* Risso). Its cold storage and industrial utilization**].
 Rev. Fac. Agron. Univ. Montevideo 1943 : No. 34 : 205-74.

In this article, information is presented on the quality, before and after cold storage, of a series of lemon varieties grown in Uruguay. In a section on industrial utilization, varietal differences in pectin content are noticed.

1300. SMITH, B. W. 634.58:581.162.5
Macrosporogenesis and embryogeny in *Arachis hypogaea* L. as related to seed failure.
 Amer. J. Bot. Suppl. 1946 : 33 : p. 826. (Abst.).

A case of failure of the seeds to develop in the variety Jumbo appears to be due chiefly to early abortion of the embryo.

1301. VIDAL, V. CANHOTO and
 NETTO, I. COSTA 634.63:581.6(46.9)
 Azeites elementares. (**Individual olive oils**).
 Agron. Lusitana 1945 : 7 : 109-20.

The olive oils obtained from the four Portuguese varieties Galega, Verdeal, Carrasquenha and Redondil have been analysed. Since none of the oil obtained from single varieties appears to be suitable for immediate utilization, it is advisable to establish mixed olive groves including several varieties.

1302. DONNO, G. 634.63:582(45)
 L'olivicultura in provincia di Benevento con particolare riguardo alle principali razze di olivo coltivate. (**Olive cultivation in the Benevento province with particular reference to the main varieties of olive cultivated**).
 Ann. Fac. Agrar. Portici, Univ. Napoli 1942-1943 : 14 : 308-56.

The improvement of olives in the Benevento province of Italy, as this general study shows, depends on three main factors, namely, race, climatic and edaphic influences, and agricultural operations. Little or nothing has been known so far as to the varietal characteristics of the olives grown, of which there are some 60 or more in the province as a whole. The eight varieties considered the best are here described in full, details being given of the vegetative characters, the characters of the fruit and kernel, disease resistance, vegetative cycle, yield and quality of product. Indications are also given of the various synonyms. None of these varieties is without defects, which could, however, be remedied by breeding work; nevertheless they are superior to the other varieties grown in the province and their cultivation is recommended in preference to others. The varieties in order of merit are placed as follows: Olivella, Racioppella, Cerezegna, Ortolana, Tonda, Ortice and Caiazzana, and Ogliarola.

1303. WOLFE, H. S.,
TOY, L. R. and
STAHL, A. L. 634.653(75.9)
Avocado production in Florida.

Bull. Fla Agric. Ext. Serv. 1946 : No. 129 : Pp. 107.

This bulletin presents information on the following subjects: the history of avocado cultivation; the uses of the fruit; the distribution of the crop in Florida; the West Indian, Guatemalan, Mexican and inter-racial hybrids grown in Florida; hardiness; the problems of pollination and inter-planting; chemical analysis of the fruit; propagation; and diseases and insect pests. A bibliography and list of the avocado varieties cultivated in Florida are also included.

1304. STEVENS, H. E. and 634.653-2.422.1-1.521.6(75.9)
PIPER, R. B. 634.653-2.484-1.521.6(75.9)
Enfermedades del aguacate en La Florida. (**Diseases of the avocado in Florida**).

Rev. Fac. Nac. Agron. Colombia 1942 : 4-5 : Nos 16-17 : 11-51.

Notes are included on the varietal resistance of Floridan avocados to *Sphaceloma Perseae* and *Cercospora purpurea*.

1305. 634.71:575.127.2(76.4)
State news. Texas.

Amer. Fruit Gr. 1947 : 67 : No. 7 : p. 27.

Notes are given on Earli-Ness (R40-4), Big-Ness (R40-51) and Regal-Ness (R40-202), new varieties developed by back-crossing the nessberry to the wild dewberry. Earli-Ness began to ripen on 18 April in the test carried out in 1946. Big-Ness bears large fruit and is early maturing. It is, however, only suitable for domestic cultivation, since the fruit are too soft for transport. Regal-Ness crops about a week later than Earli-Ness; it resembles this variety in most of the characteristics of its fruit and cane.

1306. GUSTAFSSON, Å. 634.71:576.16:575.22
The genesis of the European blackberry flora.
Acta Univ. Lund. 1943 : 54 : Pp. 199.

A comprehensive survey is given of the natural variation and putative origin of the European blackberries.

After a short historical introduction, the morphology and taxonomy of the blackberries are treated, and these sections are followed by descriptions of the blackberry floras of Switzerland, the French Pyrenees, Bavaria, Belgium, Great Britain, Ireland, the Carpathians, the Azores, the Canary Islands, Madeira, Portugal, Italy, Bulgaria, the Caucasus, Poland and Scandinavia.

The role of pseudogamy and apomixis, hybridization, autosegregation and bud mutation is then elucidated, also the significance of chromosomal constitution, meiotic aberrations and polyploidy.

In the light of the foregoing, the author discusses the taxonomic status of the group and suggests how it may have arisen. It is thought probable that, in the Pliocene era, there were a group of diploid species, represented today by such forms as *Rubus Bollei*, *R. ulmifolius*, *R. tomentosus*, *R. incanescens*, *R. moschus* and possibly *R. alnicola*. Many others, however, probably existed, but have since become extinct or are so rare now that they have not yet been discovered. By a complex set of processes involving hybridization of all or most of the Pliocene diploids, accompanied by polyploidy and apomixis, the present wide range of polyploid forms was probably derived. It is emphasized in support of this conclusion that the range of variation of the present-day polyploids considerably exceeds that of the known diploids.

1307. WASSCHER, J. 634.73:582(49.2)
De in ons land inheemsche en gekweekte *Vaccinium*soorten. (**The indigenous and the cultivated species of *Vaccinium* in our country**).
Tijdschr. Ned. Heidemaatsch. 1943 : 55 : 148-55.

The various species in Holland are described with notes on their geographical distribution and habitats.

1308. DERMEN, H. 634.76:576.356.5:575.255
Periclinal cytochimeras and histogenesis in cranberry.
 Amer. J. Bot. 1947 : 34 : 32-43.

A description is given of one tetraploid strain of cranberry and of four mixoploid ($2n/4n$) chimaeras. The latter have been used to follow the ontogeny of the apical meristem of the stem.

1309. LEYVRAZ, H. 634.835(49.4)
 Les vignes hybrides dites producteurs directs (PD). [**The hybrid vines called direct producers (PD)**].
 Publ. Sta. Fédérale Essais Viticoles Arboricoles Lausanne-Pully 1943 :
 No. 322 : Pp. 16.

After a brief introduction dealing with the history of direct producer hybrids, the author discusses their value in Switzerland, and presents descriptions of the following forms: the Seibel vines 156, 1000, 5455, 5575, 7042, 7157, 7053, 8635, 8718, 8745, 10,096, 10,878 and 13,053, the Seyve-Villard vines 3-160 and 5-247 and Oberlin 604.

1310. LEYVRAZ, H. 634.835(49.4)
 Expériences dans la culture des raisins de table. (**Observations on the cultivation of dessert grapes**).
 Publ. Sta. Fédérale Essais Viticoles Arboricoles Chimic Agric., Montgibert, Lausanne 1946 : No. 350 : Pp. 12.

Descriptions are given of Swiss dessert grape varieties.

1311. PROSPERI, V. 634.835:575(45)
 Contributo alla produzione e studio di nuove varietà di uve da tavola. 634.835:575"793"
 (**Contribution towards the production and study of new varieties of dessert grapes**).
 Ital. Agric. 1940 : 77 : 755-66.

The importance of the variety in ensuring the best product is emphasized, but it is also pointed out that each variety has its own particular zone of adaptation and outside that zone often gives disappointing results. The author has therefore confined his breeding work to the production of varieties suited to certain definite areas, such as the Terracina zone of the Tyrrhenian littoral, an area renowned for its muscat grapes, but with a relatively short production season of less than a month. By crossing the local muscat forms with early maturing varieties such as Panse Precoce, a muscat form superior to the local Moscato di Terracina in fruit qualities and keeping capacity, whilst ripening 20 days earlier, has been obtained. From crosses with late varieties such as Zibibbo and Bicane, superior muscat forms ripening 15-20 days later than Moscato di Terracina have been produced. Certain other hybrids possessed of superior qualities, but ripening in the main season, are also described. Others combine the keeping capacity and fine fruit of Razaki Rosso with the delicate flavour of Gros Vert, and several other hybrids have now been selected which combine keeping capacity with late maturity.

Observations on varieties obtained from elsewhere have shown some of them to be also promising, for instance several varieties produced by Pirovano, the early varieties Perle de Csaba and its hybrid Regina dei Vigneti [Queen of the Vineyards], and the large-fruited variety Alfonse Lavallée.

1312. MOORE, R. C. 634.835:575(75.5)
The present situation with reference to new grape varieties.
 Va Fruit 1947 : 35 : 27-31.

Notes are given on commercial and domestic varieties of grapes suitable for cultivation in Virginia; a discussion of breeding problems is also included.

1313. DALMASSO, G.,
COSMO, I. and
DELL'OLIO, G. 634.835:575.12:581.6
Gli ibridi produttori diretti a Conegliano. (**The direct-producer hybrids at Conegliano**).
Annu. Staz. Sper. Vitic. Enologia Conegliano 1936 : 6 : Pp. 439.

The problem of the direct producers was made the subject of investigation at the Viti-culture Station at Conegliano in 1910, and has, with certain interruptions, been studied ever since. The present volume of the annals of the station embodies the results of these investigations.

Observations were made on characters such as vigour of growth, resistance to all the main diseases of the plant and of the fruit, type of bunch, yield, flavour and time of maturity, and the colour, odour and flavour of wine produced, together with full analyses of the must and wine from 455 direct producer hybrids; 322 of them had been studied for ten years or more, the rest for not quite so long. The must and wine qualities were estimated on specimens grown on a number of different rootstocks.

Brief descriptions are given of the characteristics and behaviour of each of the varieties studied.

This exhaustive study leads to the conclusion that none of the varieties studied represents the ideal type; very few indeed have been found capable of producing really first-class wines. None of them are sufficiently resistant to phylloxera to be grown without grafting. Some of the hybrids are however more resistant to *Oidium* and *Peronospora* than the European varieties. Consequently, two copper and one to two sulphur sprays usually suffice to keep them healthy, instead of the usual eight or more of each. In fruit production, the best hybrids are not generally superior to the European varieties, though some bear fruit sooner. In general, the varieties giving rise to the best wine were not the most resistant and vice versa. Moreover, the more recent hybrids have not shown any better combination of yield, resistance and quality than the old familiar forms. Thus it seems that the interest of the direct producers remains confined to the private grower producing wine for his own consumption.

1314. DALMASSO, G. 634.835:575.242
Mutabilità delle diverse varietà di viti. (**Variability of the different vine varieties**).
Annu. Staz. Sper. Vitic. Enologia Conegliano 1938-1939 (1939) : 9 : 135-52.

An historical review is given of the age-old controversy regarding the constancy or otherwise of vine varieties, and the various causes of modification are discussed, and several well known Italian vines are cited in which two or more variants occur differing in such characters as form or colour of leaf, fruit and cluster, etc. Some of these are merely modifications due to soil or climatic influence; for instance, the typical Saint Jeannet vine of the Avignon region, when grown elsewhere, has been shown by the author to be almost indistinguishable from the variety Gros Vert. Certain old varieties, however, such as Regina [Queen] (= Dattier de Beyrouth, Razaki, etc.), are known to exist in a number of forms differing slightly from one another. Finally, definite cases of mutation are also known, such as that leading to the seedless varieties, and mutations giving rise to much larger clusters than the original forms.

In view of the existence of these variations, the importance of selection is evident. It is emphasized, however, that for a country like Italy, with immense variation in climatic and edaphic conditions, any tendency towards excessive specialization of the types selected must be carefully avoided.

1315. DALMASSO, G. 634.835:582(45)
La "Regina" e i suoi sinonimi. (**Regina and its synonyms**).
Annu. Staz. Sper. Vitic. Enologia Conegliano 1936-1937 (1937) : 7 : 235-52.

The excessive number of synonyms under which the Regina [Queen] vine occurs is ascribed partly to its great antiquity and partly to its inherent variability; some of the forms

regarded as synonyms show certain differences, which, though slight, are constant from year to year. It is thought, however, that they are not sufficiently important to warrant the forms being separated as subvarieties.

1316. COSMO, I. 634.835:582(45)
 Rilievi ampelografici comparativi su varietà di *Vitis vinifera*. (Com-
 parative ampelographic notes on *V. vinifera* varieties).
 Annu. Staz. Sper. Vitic. Enologia Conegliano 1936-1937 (1937) : 7 :
 253-99.

Detailed descriptions and illustrations are presented concerning characteristics which make it possible to distinguish between varieties that resemble each other, such as Italian Riesling and Rhenish Riesling, Sémillon, Sauvignon and Tocai, Nosiola, Durella and Rabiosa and the different forms of Raboso.

1317. COSMO, I. 634.835:582(45)
 Rilievi ampelografici comparativi su varietà di "*Vitis vinifera*"—I
 vitigni bordolesi. (Comparative ampelographic notes on varieties
 of *V. vinifera*. The Bordeaux vines).
 Ital. Agric. 1940 : 77 : 473-82.

Descriptions are given of the main varieties of Bordeaux vines grown in the Veneto province, namely Cabernet Franc, Cabernet Sauvignon and Merlot, with brief notes on certain others.

1318. FAES, H. 634.835-2.411.4-1.521.6:581.6(49.4)
 Les producteurs directs à raisins rouges dans notre vignoble. (Direct
 producers with red grapes in our vineyards).
 Publ. Sta. Fédérale Essais Viticoles Arboricoles, Montagibert, Lausanne
 1944 : No. 338 : Pp. 12.

Information is given on the yield, quality and mildew resistance of a series of direct producer red grape vines grown in various localities of the French-speaking part of Switzerland.

FORESTRY 634.9

1319. PAULEY, S. S. 634.972.3:575.125:575.42
 Early selection for heterosis in poplar hybrids.
 Genetics 1947 : 32 : p. 100. (Abst.).

The F_1 progeny of crosses of *Populus generosa* with *P. Jackii*, *P. berolinensis* and *P. robusta* were selected in the early seedling stage on the basis of vigour. The data on the subsequent growth of the selections indicate that selection for heterosis at such an early stage is not wholly satisfactory.

1320. 634.972.3-2.3-1.521.6(49.2)
 KONING, H. C. 634.972.3-2.4-1.521.6
 Verslag over het onderzoek naar den populierenkanker over 1939.
 (Report on the investigation on canker of poplar during 1939).
 Tijdschr. ned. Heidemaatsch. 1940 : 52 : 326-33.

- KONING, H. C. and
 TER PELKWIJK, A. J.
 Verslag van het onderzoek naar den populierenkanker in 1942-1943. VI.
 (Report on the investigation on canker of poplar in 1942-43. VI).
 Ibid. 1944 : 56 : 50-54.

In the first article the resistance of species and varieties of poplar to bacterial canker and cankers due to fungi, is recorded from observations continued at Hoog Keppel in 1939. *Populus nigra* L., *P. nigra* var. *betulifolia* Torr., *P. nigra* var. *italica* du Roi and *P. nigra* var. *plantierensis* Schneid., and also some of the balsam poplars seemed resistant to crude bacterial preparations but not to pure cultures of the fungi or to *Pseudomonas rimaefaciens*, whereas *P. brabantica* Houtz., *P. candicans* Ait. and *P. Fremontii* Wats. seemed resistant to pure cultures but not to the crude inoculate.

The second article continues the study and gives tabulated data on the results obtained with various species of poplar at different centres from 1938 to 1943.

1321. RÉGNIER, R. 634.972.3-2.3-1.521.6:582:001.4
 Le chancre suintant et les différents types de peupliers. (**Running canker and the different types of poplar**).
 C.R. Acad. Agric. Fr. 1943 : 29 : 335-40.

Details are given on the resistance to bacterial canker of the poplar varieties and hybrids grown in France. A note follows by Guinier pointing out how nomenclatural confusion in the genus *Populus* retards the development of resistant forms.

1322. LINDQUIST, B. 634.972.6:575.22:582
On the variation in Scandinavian *Betula verrucosa* Ehrh. with some notes on the *Betula* series *Verrucosae* Sukacz.
 Svenska Bot. Tidskr. 1947 : 41 : 45-80.

An analysis is presented of the natural variation of series *Verrucosae* of the genus *Betula*, with special reference to the Scandinavian forms. In Scandinavia itself, two varieties of *B. verrucosa* Ehrh. are recognized, var. *saxatilis*, the central European type, which is believed to have entered Scandinavia from the south, and var. *lapponica*, which is thought to have entered from the north-east. *B. verrucosa* var. *lapponica* is closely related to the Siberian species *B. platyphylla* Sukacz., which is here reduced to a variety of *B. verrucosa*. Along the Pacific coast of Asia, although *B. verrucosa* types still occur, a distinctive series of Far Eastern forms is also found, and these, including *B. japonica* Sieb. and *B. kenaica* Evans, are tentatively associated by the author under the one species *B. kenaica*. *B. kenaica* also appears to be present in North America, where it hybridizes with *B. resinifera* Britt.; some of the American forms are closely related to *B. verrucosa* var. *saxatilis*. The remaining American representatives of the series *Verrucosae*, *B. populifolia* Marsh. and *B. coerulea-grandis* Blanch., are easily separated, both on account of their morphology and geographical distribution, from the other species of the series.

1323. ANDERSSON, E. 634.975:576.356(48.5)
A case of asyndesis in *Picea Abies*.
 Hereditas, Lund 1947 : 33 : 301-47.

Descriptions are given of the course of meiosis in normal trees of *P. Abies* and in an asynaptic specimen from Gröttvål. In the latter, there was a tendency for restitution nuclei to be formed and in some cases manifestations of chromosome stickiness occurred. Sticky chromosomes have also been observed in three other spruces, two from Brunsberg and the other from Höljes.

The progeny obtained from open pollination of the asynaptic spruce differed considerably in height, growth habit and stomatal size.

VEGETABLES 635

1324. BREMER, A. H. 635:581.143.26.035.1(48.1)
 635.7:581.143.26.035.1(48.1)
 Daglængd og grønsakdyrking. (**Length of day and vegetable growing**).
 Meld. Stat. Forsøgsgard i Grønsakdyrking Kvithamar i Stjørdal, Oslo
 1943 (1944) : 24 : G5-G48.

Detailed results, with illustrations, are given relating to the effects of day length upon the growth of many kinds of vegetables and herbs in several localities in Norway. The following have been shown to be long-day plants: chervil, nettle, common borage, coriander, aniseed, fennel and early turnip (half-long species of forcing varieties). The following are neutral to long and short day, chives, Welsh onion, caraway, cress, purslane and some early varieties of garden peas. Similar experiments with other plants are still in progress. The relation between forcing and length of day treatment is also being investigated with various vegetables.

Results of research by other workers on day-length effects upon various crop plants are tabulated.

1325.

KRISTENSEN, R.

635-1.521.5(48.9)

635:001.4(48.9)

Indskraenkning af Antallet af Sorter og Stammer af Køkkenurter.

(Limiting the number of varieties and strains of vegetables).

Nord. JordbrForskn. 1943 : Nos 5-6 : 170-76.

The pros and cons of the question of reducing the number of varieties and strains of vegetables in Denmark are discussed from the standpoint of the seed producing firms and the market requirements for the different kinds of vegetables. The Danish system of approval of varieties is compared with the system in Sweden and Germany, and the lecturer proposes that, instead of the rigid German system of restrictions and prohibitions based upon legislation, in Denmark free co-operation between the interested parties—persons who use the seed, concerns in charge of the trials and the seed firms—would be the most suitable; the government authority concerned with relevant research might appoint a committee to deal with the various problems involved.

Nomenclature of varieties and strains and the need for describing and publishing the names of superior strains, whether approved or not, are discussed.

In the lecturer's opinion, the number of varieties should be reduced, but not the number of strains. Seed of unapproved strains should be sold under the name of the variety, and not under private designations for the strain, to avoid confusion with the names used for approved strains.

1326.

LAMM, R.

635.00.14(48.9)

Nyare danska sort- och stamförsök med köksväxter. **(Recent Danish trials of varieties and strains of vegetables).**

Årsb. Jordbruksforskning, Stockholm 1946 : 136-46.

The past and present organization of vegetable trials in Denmark, and the centres where they are conducted, are briefly mentioned, and the system of approval and designation as well as the conditions of sale of recognized varieties are explained.

The present report records the results of trials with rhubarb, garden beets, winter carrots and onions.

The Joint Committee for Vegetable Trials conducted tests of spinach, radishes, cucumbers and tomatoes.

In the spinach trials, four strains of Første Snit (First Cut), two of Viroflay and one of Matador were successful.

Among the radishes for forcing in hot beds, one strain of Gaudry, six of Halvlang Hvidspitset [Medium-long White Topped], one of Meteor, two of Non Plus Ultra, and three of Oval Amager were approved, while for forcing in the cold frame, five strains of Gaudry and seven of Halvlang Hvidspitset were approved.

The Ideal cucumber proved least difficult to raise and the most prolific of the varieties tested. Strains of Bonner Beste, Dansk Export and Lav Busk [Low Bush] were successful in the tomato trials.

1327.

BERGER, C. A. and

WITKUS, E. R.

635.25:576.356.5:575.125

Polyploid mitosis as a normally occurring factor in the development of *Allium cepa* L.

Amer. J. Bot. 1946 : 33 : 785-87.

Tetraploid cells are formed regularly in the cotyledon mesophyll and in the cortex of the transition region between the root and shoot in *A. Cepa*. Tetraploid cells do not occur normally in the root.

1328.

FEDOROV, G. V.

635.25-2.111-1.521.6:575.127.2

(Frost resistant onion hybrids).

Trudy Omsk. Sel'skokochoz'jaistvennogo Inst. imeni S.M. Kirova (Trans. Kirov Inst. Agric. Omsk, U.S.S.R.) 1939 : 4 (17) : 133-36.

The aim of the author's experiments in interspecific hybridization of onions, begun in 1934, was to combine the valuable characters of *Allium Cepa* with the frost resistance of *A. fistulosum* and *A. altaicum*. In the 1934 experiments, pollination of 320 florets gave 104

seeds, and, ultimately, 12 viable plants, and of these three in the open survived the winter, and, at flowering time, were more vigorous than the parents, while their morphological characters, e.g. shape and colour of flowers, buds and inflorescence, and size of the teeth at the base of the stamens, were intermediate.

More extensive crosses were made in 1935, viz. Zitauer x *A. fistulosum* and the reciprocal; Zitauer x *A. altaicum*; Rubcovskii and also Bessonovskii, each pollinated by the same two species; Rostovskii x *A. fistulosum*; Pogarskii x *A. fistulosum*; and Pogarskii x Bessonovskii. In all, 94 plants were obtained, which, like the 1934 hybrids, showed marked heterosis with intermediate morphological characters. The foliage of the hybrids, as compared with *A. fistulosum* and *A. altaicum*, was superior, more tender and tasted better.

From the practical aspect, these crosses indicate: (1) that though most of the hybrids are sterile, normal seed capable of germination can be obtained by using pollen from parental forms; and (2) that from the hybrid forms that produced a well formed bulb, resistant to low temperatures, there is promise of obtaining an onion type to be grown for the bulb.

1329. CURRENCE, T. M.

635.31:575

Progeny tests of asparagus plants.

J. Agric. Res. 1947 : 74 : 65-76.

Data on the yields of asparagus strains grown from open-pollinated seed indicated that the higher yielding pistillate parents tended to produce higher yielding progenies; and also that selection on the basis of seedling size is valuable.

Progenies derived from different combinations of parental plants of both sexes were compared for yield, sex ratio and spear size. Marked differences were observed in the yields of the progenies from the different male and female parents. Distinct differences in combining ability were also noted. Parent yield and the yield of the single cross progeny were not found to be highly correlated.

The possible genetic causes of the few cases of deviating sex ratios observed are discussed.

The data indicate that selection based on the spear size of the parents is not satisfactory. Spear diameter proved to be highly correlated with spear weight, suggesting a simple indirect method of estimating spear diameter.

Methods of asparagus breeding are discussed, with reference to the selection of superior female and male plants in the production of open-pollinated seed, single and double cross hybrids, the use of an all-male population which takes advantage of the higher yielding capacity of male plants, and improvement by sib-crossing for several generations and subsequent hybridization of the inbred lines.

1330. WALKER, J. C. and

FOSTER, R. E.

635.34:577.16:575.11

The inheritance of ascorbic acid content in cabbage.

Amer. J. Bot. 1946 : 33 : 758-61.

The mode of inheritance of ascorbic acid has been studied in crosses between various yellows-resistant cabbage strains with a low ascorbic acid content and a line of Wisconsin All Seasons with a high vitamin content. The F_1 progenies had vitamin contents approximately mid-way between the parent strains. In the F_2 , the content of ascorbic acid in each family could be represented as approximating to a normal distribution.

1331. WALKER, J. C. and

POUND, G. S.

635.34-2.8-1.521.6:575(77.5)

Improvement of cabbage for disease resistance.

Phytopathology 1947 : 37 : p. 23. (Abst.).

Selection of the yellows resistant cabbage varieties Wisconsin All Seasons, Wisconsin Ballhead and Wisconsin Hollander for mosaic resistance has resulted in the production of improved strains of the former two varieties. Selection of Wisconsin All Seasons is to be continued to obtain still greater resistance to mosaic and a higher ascorbic acid content. Wisconsin Hollander possesses only Type B resistance to yellows and is very susceptible to mosaic. By hybridization with Wisconsin Ballhead and selection for Type A resistance to yellows and mosaic resistance, lines homozygous for Type A reaction and showing a higher degree of resistance to mosaic have been secured; selection for satisfactory commercial characters is to be continued.

1332. HEIDT, K. 635.346:581
 Meerkohlarten (*Crambe hispanica* L., *Cr. abyssinica* Hochst., *Cr. maritima* L., *Cr. tatarica* Jacq.) als ertragreiche Öl-, Gemüse- und Futterpflanzen. [Species of sea-kale (*C. hispanica* L., *C. abyssinica* Hochst., *C. maritima* L., and *C. tatarica* Jacq.) as high yielding oil, vegetable and fodder plants].
 Pflanzenbau 1945 : 20 : 170-76.

Cultivation experiments were carried out in the Ukraine with several species of sea-kale, including the four mentioned above. *C. hispanica* L. and *C. abyssinica* Hochst. have oil contents in the dry seed of 51% and 53% respectively. These two species seem promising for cultivation in Western Europe; both have a short vegetation period and in the Ukraine the seeds retain their germination energy during dry cool storage. The young plants are relatively frost resistant, withstanding temperatures as low as -5°C .; they are also drought and pest resistant. Both species were found to be self-fertile; normally cross-pollination is effected by bees, both being rich in honey. *C. maritima* L. contains only 40-3% of oil.

E. W.

1333. BISHOP, C. J. 635.356:576.356.5:581.162.5
 The genetical basis of sterility in tetraploid broccoli.
 Genetics 1947 : 32 : p. 78. (Abst.).

An investigation was made of cross- and self-compatibility in the F_2 generation of crosses between tetraploid broccoli plants, the development of the pollen tube being used to determine compatibility relationships. It was found that certain plants, if used as male parents, were always cross-compatible, although quite frequently the reciprocal crosses were incompatible. Distinct differences were observed in the crossing behaviour of self-sterile and self-fertile tetraploid plants.

1334. CHIN, T. C. and YOUNGKEN, H. W. 635.48:576.312.35
 The cytotaxonomy of *Rheum*.
 Amer. J. Bot. Suppl. 1946 : 33 : p. 840. (Abst.).

The following chromosome numbers are reported: $2n = 22$ in *Rh. Franzenbachii*; $2n = 44$ in *Rh. tataricum*, *Rh. compactum* and *Rh. altaicum*; and $2n = 66$ in *Rh. australis*. It is suggested that the tetraploid species are amphidiploids.

1335. RIETBERG, H. 635.61/3-2.484-1.521.6(49.2)
 De fusariose van komkommers en meloenen. (The fusariosis affections of cucumbers and melons).
 Meded. Tuinbouw-Voorlichtingsdienst, 's Gravenhage 1940 : No. 20 : Pp. 48.

This pamphlet, which includes some original observations and experimental results, deals comprehensively with the subject of *Fusarium* disease. The following aspects are of interest to plant breeders: genotypic and environmental susceptibility of different types of cucumbers and of melons; the virulence of the parasite and the resistance of the host; and the roles of environment and season in the incidence of disease.

1336. JANNACCONE, A. 635.611:575"793"(45)
 Risultati di un sessennio di lavoro per la selezione del popone invernale di Capua (var. Palermitano). [Results of some six years selection work on the Capua winter melon (var. Palermitano)].
 Ann. Fac. Agrar. Portici, Univ. Napoli 1942-1943 : 14 : 176-83.

Some 10 centners of fruit of this variety, which is characteristic of the Capua district, were examined and 496 fruits selected and stored through the winter. By 15 December only about 100 of them were still sound. A further examination was made on 1 January, and among the fruits remaining those with undesirable morphological features or inferior quality were also discarded. The seeds of the selected fruits were sown, and the progeny subjected to further selection, and in 1938 the 25 best lines were selected. Further examinations, however, showed two of the lines to be distinctly superior to the rest as regards

the combination of desirable characters such as yield and size of fruit (over 2 kg.), percentage of typical forms, late maturity, quality of the flesh and refractometric index. These lines, 266/3 (2) and 1456 (2), have been finally selected and their seed issued to the growers.

1337. SHIFRIS, O. 635.62:575.115:581.01

On developmental reversal of "dominance".

Genetics 1947 : 32 : p. 103. (Abst.).

A cross between a green-fruited strain of *Cucurbita Pepo* with a vinous growth habit, and a yellow-fruited strain with the bush habit, showed a reversal in the genetical ratio of the phenotypes during the growing season. This is ascribed to the heterozygotes manifesting the characters of one parent early in the season and those of the other parent later on in the season. Evidence has been obtained suggesting that heterozygotes differ from each other in the stage at which the turning-point in their reaction occurs, as well as in its duration, depending upon the particular allelic combination. The author emphasizes that the phenomenon of developmental reversal of dominance opens up a new approach to the study of gene action and heterosis.

1338. MÜLLER, K. O. 635.63-2.484-1.521.6:575

Zur Züchtung krätze- und blattbrandwiderstandsfähiger Gurken.
(**Breeding cucumbers resistant to scab and leaf blotch**).

Kranke Pflanze 18 : Nos 5-6.

[From Tijdschr. PlZiekt. 1942 : 48 : 119-20].

Varietal resistance to *Cladosporium cucumerinum* and *Corynespora Melonis* and its possible genetic basis have been investigated. Variation in the resistance of varieties and strains from different sources is attributed to hybridity of the cucumber plants.

1339. CARSON, C. M. 635.64:575(76.4)

This tomato grew up!

Sth. Seedsman 1947 : 10 : No. 2 : p. 11.

An improved strain of the Porter tomato, named Porter's Pride, has been developed by Porter and Son, Stephenville, Texas. It is reported to bear fruit five times the size of those of the original variety. Other desirable characters include high yielding capacity, ability to keep well, early maturity, and drought resistance.

1340. IPATJEV, A. N. and

GAENKO, A. V.

635.64:575"793"

(**Analysis of earliness in the tomato**).

Trudy Omsk. Seljskohozaistvennogo Inst. imeni S.M. Kirova (Trans.

Kirov Inst. Agric. Omsk, U.S.S.R.) 1939 : 4 (17) : 127-31.

For this investigation about 500 specimens of different varieties of the tomato *Lycopersicon esculentum* and a few specimens of *L. pimpinellifolium* and *L. cerasiforme* were available. Selection for earliness has been effective, and an advance of at least 10 days in time of ripening, as compared with Bison and Viking, should be obtained.

It is shown that characters contributing to earliness in the tomato are (1) a low position of the first cluster on the stem, (2) determinate habit, and (3) a simple cluster, classified by the writer under subvar. *simplex*, as opposed to a two-sided cluster, classified under subvar. *bipares*. Plants with these three characters and with fruits with many locules are now being selected to obtain varieties 10-15 days earlier than ordinary early types.

1341. LESLIE, W. R. 635.64:575.125(71.27)

Manitoba news letter.

N.S. Dak. Hort. 1947 : 20 : 21, 29.

A note is included on F₁ hybrid tomato breeding at the Dominion Experimental Farm, Morden, Man., which is chiefly concerned with bush types. Early Chatham x Bounty and other hybrids have given promising results; the possibilities of double cross F₁ hybrids are also being studied.

1342. WILSON, K. S. and
WITHNER, C. L. (JUN.) 635.64:575.257
635.64:577.16:581.165.71
Stock-scion relationships in tomatoes.
Amer. J. Bot. 1946 : 33 : 796-801.

An attempt has been made to repeat the experiments of Avakjan and Jastreb on vegetative hybridization in the tomato (cf. *Plant Breeding Abstracts*, Vol. XII, Abst. 82). Using the technique described by the Russian investigators, grafts were made in various reciprocal combinations between the American varieties, Bonny Best, Golden Queen, Crystal White, Red Plum and Yellow Pear.

No modification in the external character of any of the graft components was observed in any of the combinations tried. Analyses of the thiamin, riboflavin and niacin contents of the graft component were also made, but no significant effect other than a general tendency for the vitamin content of grafted plants to be lower than that in ungrafted plants was observed.

1343. MACARTHUR, J. W. and
CHIASSON, L. P. 635.64:576.356:575.127.2
Cytogenetic notes on tomato species and hybrids.
Genetics 1947 : 32 : 165-77.

Interspecific hybrids of *Lycopersicon esculentum* x *L. hirsutum*, *L. pimpinellifolium* x *L. hirsutum*, *L. peruvianum* x *L. glandulosum* and *L. esculentum* x *L. peruvianum* have been studied. Chromosome pairing in the F₁ hybrids tended to be regular, while tetraploid F₁ hybrids obtained by colchicine treatment were markedly sterile and multivalents were frequent.

It is concluded that evolutionary differentiation within the genus *Lycopersicon* has been genetic rather than chromosomal.

1344. GOROSTIAGA, A. 635.64:577.16(89)
633.842:577.16(89)
Acido ascorbico (vitamina C) en tomates, pimientos morrones y ajies.
[Ascorbic acid (vitamin C) in tomatoes, sweet peppers and
chillies].
Rev. Fac. Agron. Univ. Montevideo 1944 : No. 35 : 99-112.

Data are presented on the ascorbic acid content of a series of varieties of tomatoes, sweet peppers and chillies at various stages in development and at various times throughout the year, from Uruguay.

1345. RICK, C. M. 635.64:581.162.3:581.49:575.11
**A hair-suppressing gene that indirectly affects fruitfulness and
the proportion of cross-pollination in the tomato.**
Genetics 1947 : 32 : 101-02. (Abst.).

The effects of a single recessive gene, *dl*, upon the development of epidermal hairs on the stems, petioles, peduncles and pedicels of the tomato plant are described. The gene causes a reduction in the size but not in the number of the larger trichomes, and a reduction in both the size and number of the glandular hairs and shorter trichomes. The unicellular hairs that normally bind the anthers together to form the staminal tube are absent in *dl dl* plants. In the field, such plants yield about 10% as many fruits as *dl+* and *++* plants. Artificial self-pollination restores normal fertility. The proportion of hybrid progeny produced by *dl dl* plants indicates that nearly half the seeds set under conditions of open-pollination develop as the result of outcrossing brought about by insects; in the normal tomato outcrossing amounts to only 1-2%. Since seed production is greatly diminished, it is suggested that this increase in the proportion of hybrid progeny probably effects a reduction in the amount of self-pollination to a much greater extent than an increase in the amount of cross-pollination.

1346. FOSTER, R. E. and
WALKER, J. C. 635.64-2.484-1.521.6
Predisposition of tomato to *Fusarium* wilt.
J. Agric. Res. 1947 : 74 : 165-85.

In this study on the effect of environmental conditions on the susceptibility of the tomato

to *F. oxysporum* f. *Lycopersici* (Sacc.) S. et H., it is shown that the degree of susceptibility of the two varieties Bonny Best and Marglobe can be altered one way or the other to a considerable degree. Under the range of experimental conditions studied, the variety Red Currant remained immune.

1347. ALEXANDER, L. J. 635.64-2.484-1.521.6:575(77.1)
Development of a *Fusarium*-wilt-resistant glasshouse tomato variety.

Phytopathology 1947 : 37 : p. 1. (Abst.).

Selections showing good yields and satisfactory resistance to race 1 of *Fusarium* wilt under greenhouse cultivation in Ohio have been obtained from crosses and back-crosses involving the Globe tomato variety. The lines are to be further tested for yield.

1348. VIRGIN, W. J. and MALOIT, J. C. 635.64-2.484-1.521.6:578.08
The use of the seedling inoculation technique for testing tomatoes for resistance to *Verticillium* wilt.

Phytopathology 1947 : 37 : 22-23. (Abst.).

A technique for the seed inoculation of tomatoes, useful in tests of varietal resistance to *V. albo-atrum*, is reported.

1349. BOYENVAL, J. 635.652:581.48(44)
 Essais préliminaires sur la normalisation des variétés de haricots. I.—
 La proportion des téguments dans le poids des grains secs. (Preliminary
 attempts at standardizing the varieties of beans. I.—The
 proportion of the integuments in the weight of the dry seeds).
 C.R. Acad. Agric. Fr. 1947 : 33 : 90-93.

Varietal differences in the relative proportion by weight of the testa to the dry seeds of beans grown in France are tabulated.

1350. KOOPMAN, C. 635.652-2.3-1.521.6(49.2)
 De bestrijding der vetvlekkenziekte. (The control of grease spot
 disease).
 Tijdschr. PlZiekt. 1944 : 50 : 62-68.

The seriousness of this disease, caused by *Pseudomonas medicaginis phaseolicola* (Burkholder), is evident from a report in 1929 that bush bean growing would become impossible in Bulgaria owing to the rapid spread of the disease, if resistant races could not be found. The degree of resistance of the brown bean Ceka, a Northern Holland land race, and the selection Beka derived from it, is recorded in various years in Holland. When Ceka remains sound, it surpasses both the Northern Holland and the Beka brown bean in yield.

1351. SCHULTZ, H. K. and DEAN, L. L. 635.652-2.8-1.521.6:575.11
Inheritance of curly top disease reaction in the bean, *Phaseolus vulgaris*.
 J. Amer. Soc. Agron. 1947 : 39 : 47-51.

The data from crosses involving curly top resistant and susceptible bean varieties indicated that resistance is a dominant character. The varieties studied included Common Red Mexican, Burtner, Great Northern U.I.15, Red Kidney, Dark Red Kidney and Bountiful. The data on the F_2 segregation for resistance and susceptibility to curly top, however, did not give evidence of a simply inherited reaction. The authors suggest that the data may be explained by the hypothesis of two factors, the dominance of one and the recessiveness of the other resulting in resistance.

1352. PORTÈRES, R. 635.655:575(66.52)
 Observations sur les possibilités de culture du soja en Guinée forest-
 ière. (Observations on the possibilities of cultivating the soya
 bean in the forest region of Guinea).

Bull. Agron. Minist. France d'Outre Mer 1946 : No. 1 : Pp. 82.

A detailed description is included in this bulletin of the characteristics and behaviour of

the soya bean varieties under trial at the Sérédou Experimental Station, French Guinea. Several of these varieties are new strains selected at the station.

1353. HUMPHREY, L. M. 635.655:575(76.7)

Steel jacket soybeans.

Sth. Seedsman 1947 : 10 : No. 2 : p. 12.

The new soya bean varieties, Dortchsoy No. 2, Dortchsoy No. 7 and Dortch's Improved Ogden, have been produced at the Robert I. Dortch Seed Farms, Scott, Arkansas. The varieties show marked superiority over previously available varieties in the Southern United States in their resistance to shattering and good yielding capacity. They are also resistant to lodging. The maturation period of Dortchsoy No. 2 and Dortch's Improved Ogden is 144 days, while that of Dortchsoy No. 7 is 138 days.

1354. HOLMBERG, S. A. 635.655:575.12(48.5)

Från sojaväxtförädlingen vid Fiskeby. (On soya bean breeding at Fiskeby).

K. LantbrAkad. Tidskr. 1946 : 85 : 373-84.

The different types of soya bean grown in Japan and elsewhere are mentioned and the difficulties of breeding this crop in Sweden are pointed out. In Sweden the object is to breed a variety ripening early in September.

From 1938 to 1940, the author made a tour in North America and Eastern Asia to find suitable types for breeding purposes. Three of the earliest varieties from Saghalin were subjected to pedigree selection and one of these selections, of particularly good eating quality and ripening in mid-September, was multiplied under the name Fiskeby I. Its growth period was 125 days on a four year average, but its short stems limit its use to small areas on which it can be harvested by horticultural methods.

Crosses have also been made with the following, whose ripening time and habit are described: extra-early and early Japanese land varieties; Canadian types and East European bred varieties; German varieties and hybrid populations; Manchurian land varieties and bred varieties; and the Naken soya bean from Manchuria.

Selection from samples from the most northerly types has not been very successful. Out of 6426 crosses tried, only 872 gave progeny.

Some forms, earlier than their parents and of medium height, have been obtained from crosses of short extra-early varieties from Hokkaido and Saghalin with short, medium-early varieties from Manchuria and Germany. Many of these new hybrids reach maturity in Sweden early in September, i.e. two to three weeks before the extra-early varieties previously raised. Further hybridization is in progress to improve the yield and quality of the new hybrids.

1355. LAMM, R. 635.656:575.116.1

Studies on linkage relations of the Cy factors in *Pisum*.

Hereditas, Lund 1947 : 33 : 405-19.

Gene Cy_1 , a suppressor of Le , is probably situated between F and St ; Cy_2 , another suppressor, is closely linked with Wa and may belong to the Gp group. These findings lend support to the suggestion that Cy_1 and Cy_2 are duplicate genes, though this is not proved.

1356. NELSON, R. 635.72-2.484-1.521.6:575.127.2(77.4)

Production of mint species hybrids resistant to *Verticillium* wilt.

Phytopathology 1947 : 37 : 16-17. (Abst.).

Crosses between peppermint (*Mentha piperita*) and spearmint (*M. spicata*) have been made in Michigan, using a non-commercial variety of the latter species as pollen parent and source of resistance to *Verticillium* wilt. All attempts at hand-pollination were unsuccessful. Delay of the flowering of *M. spicata*, which flowers 3-4 weeks earlier than *M. piperita*, was brought about by making use of the positive photoperiodic response of *M. spicata* to supplementary illumination, delayed planting and other methods; hybrids highly resistant to wilt were secured by mass insect pollination. The most desirable hybrids produced mature early and give high yields of good quality oil.

The world of learning.

Europa Publications Ltd., London 1947: 60s. Pp. 520.

This work of reference giving information on cultural organizations throughout the world will be warmly welcomed by those engaged in both the sciences and arts. In years when international co-operation in the sciences and arts is being urgently sought, particularly in the activities of U.N.E.S.C.O., a reference work of this kind supplies a serious need in the task of practical international co-operation. The contents are arranged alphabetically under countries, and information is given on universities, learned societies, institutes, libraries, museums and other organizations. In view of the difficulties of communication prevailing since the end of the war, the editors are to be congratulated on compiling so comprehensive a first edition of this valuable work.

SAVORY, T. H.

57:001.4

Latin and Greek for biologists.

University of London Press Ltd., London 1946: 2s. 6d. Pp. 42.

The campaign for decapitalizing all specific names of plants, which has so many supporters in Oxford and America, is but a single symptom of the evolution of Latin from a language universally understood by scientific writers, to an unintelligible symbolism, useful merely as a method of standardizing plant names and biological terms.

To what extent the increasing use of vernaculars for scientific publications is to be welcomed is problematical. Few, however, who have to read scientific papers in languages other than their own, will fail to be grateful that Latin binomials at least are more or less internationally accepted, and that many scientific terms derived from Latin or Greek roots appear under very similar guises in a number of different languages. Our scientific vocabulary does, in fact, include a high proportion of terms which may be regarded as surviving fossils from a former internationalism, and it is as an introduction to these terms as they are used in biology, that Mr Savory has brought out his booklet.

For those totally unacquainted with either Latin or Greek, this publication might indeed stimulate their interest. A brief account is given of the Latin and Greek alphabets, the transliteration of Greek letters into Roman, inflexion, concordance and prepositions. A vocabulary then follows of selected Latin and Greek words entering into the composition of biological terms.

It is difficult, however, to recommend this booklet without serious reservations, since its general treatment is too sketchy, and, in particular, because it fails to emphasize that Latin should not be treated as a static entity, but as a living tongue that continued to develop in syntactical usage, vocabulary and orthography until the beginning of the last century and even later. The Latin of the classical authors, as might be expected, is just as unsuitable for expressing biological concepts as everyday English is now. What has happened is that many ordinary Greek and Latin terms were given more precise meanings by authors such as Aristotle, Theophrastus or Columella, and this restriction in meaning or even shift of meaning has continued to the present day. For example, *involucrum* in the classical authors applied to any sort of cover; in seventeenth century botany, it is applied to the calyx or to bracts beneath the flower, while today, the term is confined in flowering plants to a whorl of floral bracts. The majority of botanical terms have undergone a similar process of specialization in meaning, which must be appreciated if the precise force of the present terms is to be understood.

A final point concerns the term *urticle* in the list of fruits on p. 25 of the booklet. Surely *utricule*, a diminutive of *uter*, a bottle, is intended, not *urticle* from *urtica*, a nettle.

LYSENKO, T. E. and

DOBZHANSKY, T. (translator)

575.1(47)

Heredity and its variability.

King's Crown Press, New York 1946: Pp. 65.

Lysenko's opusculum on *Heredity and its Variability* was first published in 1943 (cf. *Plant Breeding Abstracts*, Vol. XV, Abst. 117), and has been republished in Russia several times since. It has come to be regarded both in Russia and elsewhere as one of the most important

expositions of Lysenko's views, and its translation into English will go far towards acquainting English readers with the substance and flavour of Lysenko's outlook.

The problem confronting any translator of Lysenko is a thorny one. Lysenko is not an easy author to follow. His deliberate rejection of current genetic terminology has forced him to improvise his own terms, and his eagerness to get his views across to the workers on State and collective farms has led him to adopt words in everyday use, which he then employs with many and subtle shifts in meaning to express his own ideas.

For the translator of Lysenko, two alternatives present themselves. Firstly, he may translate word for word, reproducing the prolix and luxuriant style of the author, with its many repetitions, its fumbblings and gropings for words in which to express ideas hitherto unexpressed, and its innumerable amplifications, digressions and qualifications in the endeavour to avoid misunderstanding. Secondly, he may translate rather more freely, reducing the style of the original to a more concise and readable form, and smoothing out the intricacies of the original, so that the meaning can be grasped without excessive strain to the reader. These two methods may be termed logical and syntactical clarification respectively, and of these, Professor Dobzhansky, in his admirable and exceedingly useful translation of Lysenko's work, has tended to adopt the latter. While reproducing as faithfully as possible the peculiarities of Lysenko's style, he has simplified the original somewhat, and has often translated by single words concepts expressed by Lysenko in two or more words of almost but not exactly the same meaning. By telescoping in this and other ways, a more readable text has resulted, and for anyone making his first acquaintance with Lysenko's writings, his task has been lightened.

For those more deeply versed in Lysenko's theories, the position is less satisfactory. Lysenko's prolixity is partly due to the novelty of his ideas, and his torrents of words, his constant use of analogy, and his frequent reiterations must be viewed in the light of his search for a medium to express biological concepts unsullied by the suspect genetics of the West. Any attempt to clarify Lysenko's syntax acts to the detriment of its logical coherence, and it is perhaps fair to point out that in certain passages Lysenko appears rather more logical in his original Russian than in translation. However, it is hardly necessary to dwell on this point, since students of Lysenko must perforce read Russian, almost the entire corpus of the writings of his school being in this language.

A warning is perhaps necessary in this connexion on a possible misuse of Professor Dobzhansky's translation. *Heredity and its Variability* is only one of the very many expositions of Lysenko's principles. In some ways it is not typical of the whole; much of it is certainly unintelligible, except with some knowledge of the history of genetics in Russia during the past two decades. It is impossible to appreciate the significance of the greater part of Lysenko's theories unless the background against which they emerged is understood. This matter has, however, been discussed at some length in a recent publication of this bureau (cf. *Plant Breeding Abstracts*, Vol. XVI, p. 365) and needs no further mention here.

Professor Dobzhansky has performed a signal service to genetics and to science generally by bringing Lysenko so close to Western readers. It is only to be hoped that his translation will bring about a greater understanding of this significant trend in Russian thought among English and American scientists. Perhaps, in a later reprint of the translation it would be possible on p. 56 to correct the spelling of the French botanist transliterated from the Russian as Milliarde; this should read Millardet.

RICHHARIA, R. H.

575:633(54)

Plant breeding and genetics in India.

Patna Law Press, Patna 1945: Pp. 403. figs, tables, photos.

The enthusiasm with which Indian plant breeders and geneticists have thrown themselves into the task of improving their country's crop plants has led to the publication of so many articles that a review summarizing their achievements to date is very timely.

Dr Richharia has attempted this onerous task and has produced a concentrated book of some four hundred pages, summarizing the work done on the various Indian crops. There are eleven chapters, dealing respectively with cereals, oil seeds, millets, leguminous plants, fibres, fruit crops, vegetables, sugar cane, medicinal plants and condiments, forage crops, and other miscellaneous crops. For each crop, the author, after a brief allusion to its

taxonomic position, summarizes the breeding work that has been done on it in India, and gives an account of the genetical work dealing with it, also in India. A useful list then follows of improved varieties of the crop in the case of the more important plants, and a bibliography concludes each section. At the end of the book, a short bibliography on vernalization, a list of miscellaneous references, and a list of improved cotton varieties that appears to have strayed from its proper place, are appended.

For plant breeders in India and elsewhere, Dr Richharia's book will find its principal use as a reference book, for the author has gone to great pains to make his bibliographies as complete as possible, including many of the official publications of Indian Agricultural Departments, which often contain useful information unpublished elsewhere. As a guide to Indian plant breeding, however, the book suffers rather from extreme condensation and a somewhat hurried and uncritical presentation, which tends to allude to information rather than unfold it.

The lists of improved varieties are particularly useful, also the vernacular names of the crops. It is a pity that the latter were not included in the index, for Indian names of crops are a source of great trouble to readers of Indian scientific literature from other countries. It is also doubtful whether genetics lends itself to national treatment. Dr Richharia confines himself to genetical work done in India, admittedly a heavy task in itself, but it must be remembered that many of the genetical findings of workers in America, China and Japan apply equally well to Indian material.

COLIN, E. C.

575.1

Elements of genetics.

Blakiston Co., Pa 1946: 2nd Ed. \$3.50. Pp. xiii + 402. 90 figs, 18 tables.

The first edition of this competently and agreeably written textbook was reviewed in *Plant Breeding Abstracts*, Vol. XII, p. 85. The second edition follows the same general lines as the first, though factor interaction is now treated before linkage; the historical approach, the emphasis on heredity in man, and the rather brief, incidental treatment of plant breeding are all found in the second, as in the first edition. The changes observed, apart from revisions in detail, are additional illustrations and new material on probability (binomial distribution and χ^2 test), blood groups in man, gene mutation, polyploidy and the position effect.

The book can be recommended to those interested in genetics as a subsidiary subject and also to the general reader. Those whose primary interest is genetics will find this book a good introduction, especially if the problems are worked out, but they should be warned that here and there the author, in simplifying his material for presentation at the right level, has left some danger points uncharted.

J. L. F.

LEA, D. E.

575.1:53

Actions of radiations on living cells.

University Press, Cambridge 1946: 21s. Pp. xii + 402. 61 figs, 83 tables, 4 pls.

It has always proved difficult to write an account of research work embracing two or more different subjects since the author cannot assume that his readers will be acquainted with more than one of these. This difficulty has confronted Dr Lea in his book on the biological effects of radiation, for he requires that his readers should acquaint themselves both with physics and biology, especially genetics.

To meet this situation, he has included elementary expositions both of the physics of radiations and of Mendelian genetics, and while geneticists will pass over the latter, the former will prove most helpful for all but specialists in the field. That an exposition of the present state of research on this subject is opportune hardly needs emphasizing, and all biologists will find extremely useful Dr Lea's survey of the more fully elaborated points in the present theory.

The aspects most fully treated include the inactivation of viruses, gene mutation, induced chromosomal aberrations, and lethal effects in bacteria and higher organisms. In each case,

the author is at pains to elucidate the physical mechanism of the changes observed, applying in most cases the *Treffertheorie* and defending it from its critics.

With regard to viruses, inactivation is attributed to a single ionization, but, while the target in the smaller viruses appears to coincide with the virus particle itself, in the vaccinia, sensitive and insensitive zones can be distinguished, corresponding, in the author's opinion, to genetic and non-genetic regions, as in the cell of higher organisms.

Artificially induced gene mutation is also attributed to a single ionization. The possibility that natural radiation is sufficient to account for the spontaneous mutation rate is rejected. The mechanism of chromatid breakage has largely been elucidated from studies with *Tradescantia*, and the advisability of discovering whether these results hold for other material is indicated. A probability approaching unity has been calculated for the chance that a proton or α -ray will break any chromatid thread through which it passes. In the case of electrons, however, a minimum number of 15–20 ionizations are needed before the chance of chromatid breakage approaches unity. The probability of chromatid breaks resulting in aberrations depends on several factors. A large proportion will reconstitute, while for exchange to take place, a maximum distance apart of 1μ of the broken ends must not be exceeded.

Some of the work that has been done on the biological effects of radiations appears to have little application in other fields, but Dr Lea draws attention to several cases in which important conclusions of general theoretical interest can be derived. It is possible, for instance, to calculate the number of genes in the organism irradiated, and results to date suggest values of one to just over a hundred for viruses, of between two and three hundred for bacteria, and of several thousand for higher organisms. Irradiation studies have also been applied to the vexed problem of the time at which the chromosome splits into daughter chromatids. Here X-irradiation studies may provide evidence that a chromosome is split, but they cannot demonstrate that a chromosome is unsplit.

Although highly technical throughout, Dr Lea's book can be strongly recommended to all biologists wishing to acquaint themselves with one of the most powerful analytical techniques of modern biology, and in particular of present-day genetics. There are four plates and a useful pair of diagrams on Pp. 194 and 195, of the various types of chromosome changes induced in unsplit and split chromosomes respectively.

NEILSON JONES, W. and
FREIER, F. (translator)

575.25

Quimeras vegetales e híbridos de injerto. (**Plant chimaeras and graft hybrids**).

Acme Agency, B. Aires 1946 : Pp. 157. 21 figs., 2 tables.

Professor Neilson Jones' monograph on plant chimaeras has long become the standard source of reference on this subject since its first appearance in 1934, when it was reviewed in *Plant Breeding Abstracts* (cf. Vol. V, Pp. 165–66). It has now been translated into Spanish by Sr Freier, whose translation appears as a member of the series of *Monografías sobre Temas Biológicos*, published by the Acme Agency of Buenos Aires.

Sr Freier's translation follows the original very closely, and Professor Neilson Jones has contributed an appendix summarizing developments in this field up to 1945. The diagrams in the new edition are rather less clear than in the original, but it can be confidently recommended to all those who would prefer to read in Spanish a succinct account of an important if somewhat obscure branch of present-day botany.

SENTEIN, P.

576.356:581.04

L'action des toxiques sur la cellule en division. (**The action of poisons on the dividing cell**).

Imprimerie Causse, Graille, Castelnau, Montpellier 1941 : Pp. 252. 4 pls.

In spite of the universality of scientific ideas, there tends to be, at the present day, a localization of certain concepts to particular countries. More correctly, this localization should be attributed to language rather than political units, for it is the former that act as barriers to the exchange of scientific ideas rather than the latter.

The truth of this observation is easily demonstrated by a comparison between the genetical literature written in English, French, German and Russian. There is, of course, a preponderance of common ideas, but there will be found, in the case of each language, certain concepts unrepresented in the terminology of the others.

During the War, when the world was forcibly severed into two, the tendency for a divergent evolution of genetic ideas was accentuated, as might be expected from present-day theories on the evolutionary importance of isolating mechanisms. In particular, research on agents affecting mitosis, which only began to get under way just before the War, tended to follow different lines in France and Belgium from those pursued in the British Commonwealth and America. The result is that the French literature abounds in such terms as *cacodylic*, *caryoclastic*, *cinephylaxia*, *euclastic*, *excitomitotic*, *mitoclastic* and *stathmocinesis*, which are seldom, if ever, found in the literature in English.

In view of the fact, however, that the pioneer work on colchicine was done by Dustin and his collaborators at Brussels, it is only fair that later workers in the same field should acquaint themselves with the developments recorded in the literature in French; and for an introductory account of this work, they could with advantage consult Dr Sentein's publication.

The author has presented a general review of the work done in France and Belgium, beginning with the early work of Dustin and Lits, and mentioning in particular Gavaudan's investigations on plant material.

The effects on mitosis of many substances other than colchicine have been investigated, including acridine and aniline dyes, arsenicals, alcohols, narcotics, metallic salts, bee venom, bacterial toxins and sulphamide drugs. Six different types of action of these substances are recognized, from the inhibition of the formation of the cell membrane after cell division to a complete blocking of the whole mitotic process. The mechanism of the various effects described is discussed, the author tending to place most emphasis on the physical properties of the agents used.

In the final chapters of his book, the author deals mainly with zoological and clinical applications, and presents a summary of his own work on animal material.

Dr Sentein's book cannot be used as a general introduction to the subject, but it is a most useful source for the data collected by French and Belgian investigators and for the ideas that they have derived from them.

SIRKS, M. J.

577.8

576.312.332

Het geslacht. Uitingen en oorzaken. (**Sex. Its expression and causes**).

J. Noorduijn en Zoon N.V., Gorinchem 1946 : No. 23 : Pp. 176. 75 figs.

The introduction to this book, whose aim is to present a survey of the varied field of the study of sex, mainly from the genetical and cytological aspects, informs us that the publication was originally intended to appear at the same time as Krediet's two books on intersexuality in mammals and sex change in vertebrates, both published in 1942. Though this plan fell through, the author's too modest hope that his survey might prove of value will certainly be fulfilled, for his book reveals an encyclopaedic knowledge of the subject and a gift for condensation which should make it well worth reading by serious students and research workers, as well as by that smaller circle of the general public whose interest is not based merely on transient curiosity. Apart from the fact that it is written in Dutch, it is stiff reading owing to the wide range of specialized knowledge it covers and the great amount of detail that has been included.

The following plan has been adopted in the survey: a consideration of the gradual evolution of sexual reproduction in lower and higher organisms is followed by discussions on the male, female and hermaphrodite conditions and on the hereditary basis of sex, including environmental factors that operate in the determination of sex. A chapter then follows on intersexuality and its genetic and cytological basis, after which environmental effects including sex reactions due to the protoplasm, and to sex hormones, are treated, with a final section on problems relating to sex determination.

An admirably brief bibliography, numerous illustrations, figures and charts, an excellent list of definitions of the scientific terms used and a subject index complete this noteworthy book.

PRÁT, S.

578.6

Rostlina pod drobnohledem. (**The plant under the microscope**).

Nákladem České Grafické Unie A.S. Praha 1945 : Pp. 205. 82 figs.

This book, written by the professor of botany at the Charles University, Prague, is intended to give an introduction into botanical microscopy both to the undergraduate and to the amateur outside a university.

It begins with a general description of the microscope and its components, and of the technique of observation, including drawing and microphotography. This is followed by details of simple methods of preparation, adjustment of the microscope and slides, and of micrometry. All these points are elucidated with examples of cells and tissues which can be easily obtained and prepared. Next comes a description of the various forms of motion visible under the microscope, such as Brownian movement, active movement of cells and movement of protoplasm, and this is followed by an account of observation of cell division. A short chapter on observation in polarized light completes the first part.

The second part begins with the fixing and preparation of permanent slides, giving practical details of various fixatives. Finally there are three chapters on microchemical and microphysical reactions.

Although containing nothing new, the book is very thorough; each new step is demonstrated by means of practical examples, and the value of the book lies not only in advising the beginner on how to carry out observations, but even more so in telling him how not to do so. There are 82 illustrations and diagrams.

G. M.

BOUILLENNE, R.

58

Phytobiologie. (**Plant biology**).

Masson and Cie, Paris 1946 : 2nd Revised Ed. 1.300 fr. Pp. 787. 287 figs.

Most botanists, after a little thought on the subject, will be prepared to regard with an indulgent eye any book which purports to deal in a general way with the biology of plants. It is becoming increasingly difficult, though it may still be possible, for the mind of one man to grasp the essentials of each separate aspect of botanical knowledge and to integrate them into a coherent system. What appears to be an insuperable difficulty comes when an attempt is made to dissect such a multi-dimensional mental structure and to lay it out in a uni-dimensional series of words from which it may be reconstructed by a student. Some branch of the subject is bound to suffer and receive disjointed and unsatisfactory treatment. However, in *Phytobiologie*, a text-book of about first-year University standard by Professor Bouillenne of Liège, a larger proportion of botanical knowledge receives unsatisfactory treatment than would appear to be absolutely necessary.

The book begins with a historical sketch in which botany is dealt with in relation to general cultural backgrounds. It is a pity that the development of the idea of plants as autotrophic organisms is not mentioned. Admittedly this is dealt with in a later chapter, but, surely, photosynthesis deserves a central position in any history of botany, however brief. After further introductory chapters dealing with cell structure, protoplasm and vital phenomena in general, the book is divided into three main sections. The first of these, *Reproduction de la Série Végétale*, is rather evidently morphology written up by a physiologist. It is doubtful if any responsible student of the algae would approve of the classification adopted by the author for that group. In the section on blue-green algae, the natures of spore and heterocyst are confused, a mistake that could only have arisen from hurried perusal of some elementary account of these organisms. In the second section, *Biologie des Angiosperms*, the plan is adopted of dealing with the structure and functions of the various organs side by side. To the physiologist this has much to recommend it, but it is possible that an anatomist might disapprove. An introductory section on cell physiology would have been an improvement here; as it is, it is to be hoped that the student will not get the impression that only the cells of roots show permeability phenomena, and that only leaf

tissues respire. The final section deals with two rather ill-assorted subjects, the biochemistry of plant substances, and growth and development of the organism as a whole, under the general title *Cinétique du développement végétal*. It is extremely doubtful whether protein synthesis is a process controlled by the same enzymes that are responsible for protein hydrolysis, as is suggested on p. 705.

The illustrations are, on the whole, good and the format pleasing. In conformity with a deplorable continental habit, the book is cased in paper. It is doubtful if *Phytobiologie* will be of much value to readers outside the French-speaking countries. G. E. F.

NEWMAN, I. V.

58

The living plant.

A. H. and A. W. Reed, Wellington, N.Z. 1946: Pp. 128.

The method of teaching practical work in botany to first year university students seems to have settled by now into a fairly easily recognized traditional form, at least, in as far as the British Commonwealth is concerned. The same types, with surprisingly few exceptions, appear to be studied in universities situated under very diverse climates, and a uniform estimation as to what is and what is not important in an elementary botanical course appears to prevail quite generally. Whether this state of affairs is a sign that the teaching of botany is nearing the ideal, or whether it merely illustrates the force of tradition, is perhaps a moot point. At any rate, such is the position, and text-books on botany must be appraised with this background in mind.

Dr Newman, in his account of *The Living Plant*, has brought out an amplified description of the work in practical botany done during the first year course at Victoria University College, Wellington, New Zealand. It follows the standard pattern extremely closely, with minor adaptations to suit it to conditions in New Zealand and Australia. As a laboratory manual, it should prove very useful, since its tersely written paragraphs are devoted almost exclusively to essentials, and avoid the discursive padding of many botanical texts.

In some respects it fails, like most botanical text-books, to present the findings of recent research on such topics as vascular anatomy, floral morphology and nuclear cytology, but any student following its directions will certainly receive a good grounding in the essential data of the subject.

It is perhaps unfair to criticize the theoretical views appearing in a practical manual, but in the present case these do give rise to the sort of misgiving mentioned earlier in this review. There are, for instance, very few indications given in Dr Newman's publication of the inadequacy of a large part of modern morphological theory, yet no one who has demonstrated to first year students will be unaware that many of their questions cannot be satisfactorily answered by standard explanations. What seems to be wrong with so many text-books is their over-dogmatic tone, which at times becomes little better than dictatorial. A book which raised difficulties instead of solving them would surely be more appropriate for university students, granted that a more dogmatic approach might be necessary at school. Perhaps, however, some student following Dr Newman's book will be prompted to ask exactly what is meant by a "summit of evolution", in which case the criticism offered above would have to be immediately retracted.

GUYOT, A. L.

58:576.12

Genèse de la flore terrestre. (**The origin of the terrestrial flora**).

Presses Universitaires de France, Paris 1946: Pp. 136.

It is interesting to notice the difference in emphasis that has characterized for some time past the English and French schools of palaeobotany. In the British Isles, most attention has been paid to the cryptogamic fossils, especially the Pteridophytes, and consequently interest has been principally directed to investigating the fossils of the Primary and Secondary Eras. In France, on the other hand, while valuable studies have been made of the floras of earlier epochs, greater attention seems to have been paid to Tertiary and Quaternary plants. Thus, in Professor Guyot's compact summary of the succession of plants throughout geological history, only 43 pages are devoted to the Primary and Secondary Epochs, while nearly 90 deal with Tertiary and later floras. In some ways, this

difference in emphasis is to be welcomed, since there is no very comprehensive general guide to the later fossil floras written in English, and Professor Guyot's synopsis can therefore be consulted with profit by anyone interested in these later floras. Moreover, the author's matter-of-fact style and his disinclination to indulge in unfounded speculations as to the phyletic history of the various plant groups all contribute to the value of his book. *Genèse de la Flore Terrestre* is however written from rather too narrow a standpoint to commend itself unreservedly as an introduction to palaeobotany. The author has availed himself almost exclusively of French sources, and in his bibliography includes only two references to English works, both by Seward. The fundamental work of Hamshaw Thomas and Harris is not even mentioned. Therefore, although Professor Guyot's work may be used as an introduction to the French literature on the subject, it cannot serve as a general introduction to palaeobotany as a whole.

63(54)

Developing village India.

Imperial Council of Agricultural Research, New Delhi 1946 : Pp. xvi + 291. 118 pls.

This special number of *Indian Farming*, produced under the editorship of Mr Randhawa, Secretary of the Imperial Council of Agricultural Research, is an important symposium on all aspects of village problems in India. Main sections are devoted to the development of village life in India, publicity and propaganda, agriculture and nutrition, the nutritional problems of the villager, animal husbandry, horticulture, cottage industries, health and sanitation, education and culture. Each of these sections contains several articles, contributed by authors who write authoritatively and with outstanding experience in their particular fields. The book gives a generous, integrated picture of the India that could come into being as the result of fundamental and country-wide scientific and social organization, an India where the appalling poverty of the agricultural population would be a thing of the past, and where an educated Indian cultivator would play an active co-operative part in village production and life. The symposium is a courageous, far-reaching contribution to social progress in India, dealing as it does with every aspect of village activity and submitting short and long term proposals for agricultural and economic reform. In the many-sided problem of the application of scientific knowledge in the development of rural India, it is obvious that the plant breeder has an important task in crop improvement, and Dr Pal, Imperial Economic Botanist at the Imperial Agricultural Research Institute, New Delhi, contributes an article on the introduction of better crop varieties, with particular reference to the benefits derived from the use of improved rice, wheat, sugar cane and cotton varieties.

The anthology is well-illustrated with 144 photographs and miscellaneous diagrams.

633

KUIJPER, J.

633(49.2)

Onze kultuurgewassen. Hun geschiedenis en hun betekenis voor den mens. (**Our cultivated plants. Their history and their importance for man**).

J. Noorduijn en Zoon N.V. Gorinchem 1945 : f. 4.75. Pp. 220. 17 figs. 51 tables.

Dutch volunteers recently accomplished the task of reclaiming part of their flooded agricultural land in three days instead of the fortnight which had been allotted for the work. It is clear that the Dutch, always an industrious people, are determined to restore their country to its pre-war state without delay. The process of reconstruction should be assisted by Dr Kuijper's book, which gives an account of the main agricultural crops which contributed so largely to the economic wealth of Holland and the Dutch East Indies.

The cultivated plants included are the agricultural crop plants, particularly of Holland, but also the great crop plants of the world, those of special importance for the Dutch East Indies being somewhat more extensively treated. The food plants comprise the starch producers (cereals, tubers, and roots), the protein producers, the oil and fat producers,

and the sugar bearing crops. Fibre plants, rubber plants, tea, coffee and cacao, and, finally, tobacco receive separate consideration.

Though the emphasis throughout is primarily economic and financial, a good deal of the information given should interest not only the general reader but also the grower or planter, and, from the historical point of view, possibly also the plant breeder. Production is, however, the keynote and the abundant statistical data is as up-to-date as the world situation permitted, 1938 being the last reliable year.

Some good photographs and a subject index add to the attractive get-up of the publication.

633
633.88
634.97(44)

MANCIOT, A.

Les plantes médicinales. (**Medicinal plants**).

Les Éditions J. Susse, Paris (undated) Pp. 160. illus.

MANCIOT, A.

Les arbres de nos forêts. (**The trees of our forests**).

Ibid. (undated) Pp. 159. illus.

MANCIOT, A.

Les plantes sauvages utiles. (**Useful wild plants**).

Ibid. (undated) Pp. 111. illus.

These three booklets will provide the amateur or the student with an attractive, though popular, presentation of information on medicinal plants, wild plants and forest trees. All three are planned on similar lines and have been illustrated in an amusing style by Lep, which adds to the pleasure of the reader, with an eye for that comedy and satire so characteristic of the French mentality.

The volume on medicinal plants deals with their history, habitats, collection, drying and sale, time of flowering, useful parts, and their properties and uses in the cure of various maladies.

There is also a detailed table of contents and an index of plant names.

The booklet on useful wild plants follows similar lines. In it the reader may be surprised to find information on simple substitutes for tobacco, soap, cachous, glue, ink and various dyes, and also on insecticides, cosmetics, hygrometric plants and plants that tell the time and the points of the compass.

The third book of the series contains a short historical note on forest land, followed by information on forest management, the distribution of forests and trees in France, the use of timber, wood products and the identification of trees. The subject index in this case is amplified by an alphabetical list of the illustrations.

Though Latin names have been avoided in all three publications, the numerous synonyms of common names of plants and trees have been included.

CASTELLANI, E.

633-2-1.521.6

Razze di piante resistenti e prevenzione delle malattie. (**Resistant races of plants and the prevention of diseases**).

Società Anonima Editrice Dante Alighieri, Genova 1943 : Pp. 96. 14 figs. tables.

In this small handbook, a lucid and succinct account is given of the principles underlying the production of disease resistant varieties of cultivated plants.

After examining the various causes of resistance and immunity, it is concluded that resistance cannot be ascribed to a single cause, but almost invariably derives from a complex of anatomical, physiological and pathological factors, and from complex interrelationships between the host and parasite. The fact that both host and parasite vary genetically adds to this complexity, and an outline is given of the phenomena of biological specialization in the fungi, with a fairly full account of the technique of distinguishing the physiological strains of rusts. An outline of the phenomenon of heterothallism follows, leading to a description of the results of hybridization, segregation and mutation in the fungi. The basic results concerning the inheritance of resistance are reviewed by reference to the literature; considerable attention is given to the determination of different degrees of

resistance and to the various difficulties attendant upon any attempt to produce, by selection or hybridization, resistant varieties combining the other qualities required by agricultural and industrial interests. Many examples of success in achieving these objects are cited, and include reference to the recent selection in Italy by Goidanich and Azzoroli (cf. *Plant Breeding Abstracts*, Vol. X, Abst. 558) of forms of elm (*Ulmus campestris* and other species) highly resistant to *Ceratostomella Ulmi*, the production of Hope wheat and its derivatives in Canada and the U.S.A., the synthesis of *Triticum timococcum* by Kostov, and the many famous series of resistant sugar canes achieved by interspecific crossing. In Italy again, Munerati has raised sugar beets possessing resistance to drought, heart rot and *Cercospora beticola* by crossing with wild beets, and Jacometti has obtained poplars resistant to defoliation. Finally, in regard to the vexed problem of the direct producer hybrid vines, Pirovano and others are quoted as supporting the German viewpoint that within the species *Vitis vinifera* there are sufficient genes to make it possible ultimately to produce a truly disease resistant European vine. It is pointed out, however, that the number of varieties cultivated in Italy is very large, each being adapted to some particular set of local conditions; to confer disease resistance on all these would therefore be a very complex problem, and the author leaves no doubt as to the magnitude of the effort that will be required to solve it.

GÄUMANN, E.

633-2-1.521.6

Pflanzliche Infektionslehre. (**The theory of plant infection**).

Verlag Birkhäuser, Basel 1945: Pp. 611. 311 figs. 90 tables.

Among the various convergent lines of research that characterize the present day, no pair of studies have approached each other more intimately than plant breeding and plant pathology. Ever since Biffen's classical researches on wheat rusts, it has been realized that combating plant disease is in large part a genetical problem. Conversely, the production of superior varieties of crop plants necessitates constant attention to their disease-resisting properties; and it is to plant breeders with this aspect in view that Professor Gäumann's finely produced volume will prove particularly acceptable.

The object of *Pflanzliche Infektionslehre* is to provide a comprehensive introduction to the general problem of plant disease, with special emphasis on fungous diseases. The earlier sections of the book describe the mechanism of infection, the place and mode of entry of the pathogen, and its distribution within the host plant.

Attention is next devoted to the relation between the life history of pathogens and the spread of disease; the phytopathological importance of saprophytic stages and of resting stages in the life history of parasitic forms is emphasized. A general survey is given also of the various methods of reproduction of plant pathogens, their distribution mechanisms, and the factors leading up to epidemic infestation.

The third and fourth chapters on the susceptibility and resistance of plants to parasitic attack are of special interest to plant breeders. The author describes the diversification of both host plants and parasites into physiological races, and outlines the mode of inheritance of resistance or susceptibility in selected plants to various diseases. It is of course necessary to remember that environmental factors, such as temperature and light, may override a genetic predisposition of the host plant to resistance or susceptibility, and similarly, that the physiological condition of the host plant, its stage of development and its degree of vigour, all affect its liability to contract disease.

A rather unpredictable element in phytopathological studies is provided by the natural variation of the pathogen, which may alter through mutation or some allied process, through hybridization and subsequent segregation, or through heterocaryosis. It has also to be borne in mind that the obscurities surrounding the passage problem are by no means resolved yet, and the complex effect of mixed inoculations involving several strains requires careful analysis. The last two chapters of Professor's Gäumann's account deal with symptomology and methods of control respectively.

It is hardly necessary to provide a recommendation of a text emanating from such a distinguished and indefatigable investigator as Professor Gäumann. *Pflanzliche Infektionslehre* is a beautifully produced and well-illustrated account of plant disease, and is likely to become a standard reference book on the important subject with which it deals.

GARNER, W. W.

633.71(73)

The production of tobacco.

Blakiston Co., Pa 1946 : \$4.50. Pp. xiii + 516. 81 figs. 11 tables.

Tobacco production is a particularly complex undertaking; perhaps in no other crop do such small details in the various characteristics of the plant part used play so important a role in deciding the commercial value of the final product. The present volume deals with all aspects of tobacco production, largely in the United States, and includes a chapter on the breeding and genetics of the crop; it has been written mainly for the use of students in agricultural colleges and universities, and for agricultural workers and planners who require information on the fundamentals of tobacco production. Part I deals with the botanical characters of the tobacco plant, the involved problem of the technical classification of leaf tobacco on the basis of class, type and grade of commercial quality, and with the international tobacco trade. Another chapter is devoted to the history of the industry and present distribution of tobacco production in the United States. Part II gives an account of methods of growing, curing and marketing; chapters on tobacco varieties, production in countries other than the United States, and diseases and pests are included. Part III presents chapters on the morphological, anatomical and chemical characteristics of the green leaf; the components of quality and the factor influencing them; mineral nutrition; characteristics of tobacco soils; the chemical composition of the cured leaf and its relation to type and quality; other physiological and chemical topics; genetics and breeding. The chapter on breeding and genetics forms a useful introduction, although inevitably in a textbook with so wide a scope, much work of interest has had to be omitted. The book is uniformly well-written, and clearly shows the nature of current problems of tobacco production and research in the United States. It should prove a standard reference work.

GRAVES, G.

634(73)

Trees, shrubs, and vines for the northeastern United States.

Oxford University Press, London 1945 : 15s. Pp. xi + 267. 68 figs.

This handbook gives a descriptive list of several hundred species and varieties of trees, and bush and climbing shrubs suitable for planting in private gardens, road-side plantations and rock gardens in the north-eastern United States. The main descriptive part of the text is arranged alphabetically under botanical names. Separate alphabetical lists of the names of the recommended deciduous trees, evergreens and other types of plants are included for convenient reference; suggestions on culture, propagation, pruning and pest control are also provided. Reference is made to species of *Acer*, *Aesculus*, *Betula*, *Carpinus*, *Crataegus*, *Fagus*, *Fraxinus*, *Malus*, *Prunus*, *Picea* and other species of possible interest to the breeder. The volume is a handy size and excellently produced.

BLATTNY, C. and

STARÝ, B.

634-2-1.521.6(43.7)

Atlas škodlivých činitelů našich ovocných plodin. (Atlas of the injurious agencies affecting our fruit trees and shrubs).

Nákladem České Grafické Unie A.S. Praha 1944 : 2nd Ed. Pp. 375. 130 pls.

In a brief foreword, the authors state that the chief purpose of this work was to supply the local fruit-growers with a collection of photographs (or drawings in a few cases where photographs could not be taken), showing the most typical injuries caused to fruit trees and shrubs (including the vine, strawberry, and a few wild berries) in Czechoslovakia by various pathogenic agencies, such as environmental, atmospheric and soil conditions, physiological factors, and bacterial and fungal diseases, and insect and animal pests. These photographs are given in the 130 beautifully executed coloured plates appended at the end of the volume, and supplemented by brief descriptions in semi-popular language of the respective symptoms observed on the host plants. Besides indicating the control measures applicable in each separate case, a special chapter gives a full list of all the chemical preparations which have been tested and officially approved in Czechoslovakia for the control of the diseases and pests, including a wide range of proprietary compounds, indicating their composition and sources of supply.

SOULIJAERT, G.

634.13:578.088(44)

Sélection de poires photographiées au verger Orléanais. (**Selection of pears photographed in the orchards of the Orléans region**).

Direction Régionale des Services Agricoles 1945 : Pp. 27. photos.

The author, who is a Professor of Horticulture, has made a study of a selection of local varieties of pears suited to the Orléans region, famous for fruit growing. The photo-gravures accompanying the text, some of which were made during the bombardments in 1944, are intended to show the professional or amateur grower the typical ideal fruit of the different varieties.

The introduction gives a description of the East, the West and the d'Olivet Saint-Hilaire districts from the standpoint of fruit-growing and the past and present methods used, with some suggestions about the future development of the industry. Below each of the twenty handsome photogravures of different varieties of pears, a short commentary appears giving particulars of the origin, fertility, vigour, morphological, floral and other characteristics of the tree and of the kind of fruit it produces. Useful details are also provided of any idiosyncracies as regards habit, most suitable methods of training and pruning, and reactions to soil and disease.

The author is to be congratulated on having produced a useful and attractive publication which can be recommended to all professionals or amateurs engaged in the production of high quality pears.

JACKSON, A. B.

634.975:582

The identification of conifers.

Edward Arnold and Co., London 1946 : 9s. Pp. vii + 152. 48 figs.

In a small pocket book of 152 pages, Mr Jackson has presented a synoptic account of the conifers grown out-of-doors in the British Isles. It has been produced to assist forestry students and others to identify the commoner species of gymnosperms, and for this purpose can be cordially recommended. Keys are provided to the genera and species, and an illustration is provided of the cones and vegetative structure of a representative species of each genus, these illustrations being taken from Dallimore and Jackson's *Handbook of Coniferae*. Botanical descriptions are not given of the species, but instead an account of their dimensions, the date of their introduction into the British Isles, their adaptability under British conditions, and the locations of noteworthy specimens.

HERKLOTS, G. A. C.

635(51.2)

Vegetable cultivation in Hong Kong.

South China Morning Post, Ltd. Hong Kong 1947 : \$12.00. Pp. 208.

86 figs. tables.

The second edition of this book on vegetable gardening in Hong Kong was written and illustrated during the internment of the author in the Stanley Civilian Internment Camp. Gardening activities by the community under these conditions were faced with particular difficulties which, in being overcome, add the weight of unique practical experience to the author's book.

The book is primarily written for the amateur gardener. Separate chapters are devoted to elementary information on plant physiology, soil properties, soil fertilization, the food value of vegetables, the control of diseases and pests, and common weeds, with special reference to vegetable cultivation in Hong Kong.

Chapters providing a collection of miscellaneous recipes, a list of local vegetable seedsmen, meteorological data; and calendars of seed-sowing and harvesting days are also included. In another chapter the author draws attention to the valuable experimental work possible to the amateur, such as the trial of new species. The vegetables which can be grown in Hong Kong are described under appropriate sections, with notes on varieties, methods of cultivation, pests and uses. All those concerned with plants as a source of food, whether amateur gardeners, commercial growers or professional scientists will find interest in these descriptions, illustrated by good line drawings, particularly those of the less familiar vegetables.

QUARREL, C. P.

635.5

Intensive salad production including some vegetables.

Crosby Lockwood and Son Ltd, London 1945 : (3rd Revised Ed.) 15s.

Pp. 250. 36 figs.

During the last few years the popularity of salad vegetables has greatly increased. Britain is now largely dependent upon home-grown produce and the supply must necessarily be enlarged if it is to meet the needs of domestic consumers, the canning trade and the developing quick-freeze industry. The publication, therefore, of a third edition of Mr Quarrel's instructive book is to be welcomed.

The book is primarily intended for the practical grower in Britain but much of the information is applicable elsewhere. In the first six chapters problems concerned with sites and soils, soil fertility, manures, irrigation, lights and frames and soil warming are fully discussed. Then follow chapters describing in detail four systems of intensive crop production, namely, French gardening, Dutch light gardening, glasshouses and cloche cropping; in the chapter dealing with the latter lie the main additions to the previous texts. Separate salad crops are then dealt with, 14 crops being listed and their requirements regarding environmental conditions, methods of cultivation, harvesting and marketing detailed.

In these 11 chapters the information is clear and of the detailed type of value to the grower. Moreover, the author has not failed to give the reasons underlying the practical instructions, setting forth the principles of good husbandry. There is, however, one surprising omission. It is to be regretted that the writer has not seen fit to make at least passing reference to soil-less cultivation, which has aroused much interest and on which there is a growing literature. The chapter on diseases and pests is the least satisfactory, as the symptoms of the diseases are sketchily described and in several instances the nomenclature of the causal organisms is incorrect. Moreover, no mention has been made of abnormal conditions due to mineral unbalance and other physiological factors.

The book on the whole is attractively produced with a good index, and the excellent photographs and diagrams clearly illustrate points raised in the text. The number of references is perhaps somewhat scanty and it is a pity that they have been given as footnotes and in a final section, rather than at the end of the chapters to which they refer.

In conclusion, anyone contemplating the intensive cultivation of salad crops would be well advised to read Mr Quarrel's book. Having done so they could not complain that they had not received adequate warning of the many factors which must be considered. The more experienced grower will find in the book a lucid discussion of the many problems with which he has been confronted and much to interest and assist him.

M. A. K.

NEW JOURNALS**Bull. Agron. Minist. France d'Outre Mer.**

The French Ministry for Overseas has recently begun the publication of a series of *Bulletins Agronomiques* to supplement its principal journal *L'Agronomie Tropicale*. The new series will contain articles unsuitable on account of their length or degree of specialization for *L'Agronomie Tropicale*. The first bulletin is by M. Portères on soya bean cultivation in French Guinea (cf. Abst. 1352). It contains much information of interest to plant breeders on the varieties tested at the Sérédau Experimental Station.

Economic Botany.

Economic Botany is a new journal devoted exclusively to the publication of articles on the whole field of plant utilization, and it aims at providing a common meeting ground for the botanist and the technologist. The contents of the first issue include articles on hybrid maize breeding, the cultivation and uses of manioc, the cork industry of California, minor fibre industries, wild medicinal plants growing in Oregon and South California, and the seaweed resources of North America. Abstracts of relevant literature are included.

Economic Botany is published quarterly, by Edmund H. Fulling, the New York Botanical Garden, New York 58, N.Y.; annual subscription \$5.00, price per single copy \$1.50.

Rev. Invest. Agric. B. Aires.

The first number of the *Revista de Investigaciones Agrícolas*, published by the Ministry of Agriculture of Argentina, has been received. This journal has been initiated so that scientists working under the auspices of the Ministry may have at their disposal a special journal for publishing the results of their researches. Till now, the lack of such a journal has necessitated the publication of such papers in various other journals. The *Revista* is to be published quarterly and will contain original papers of scientific interest only. In the first number, three papers appear: an account of the cultivated Umbelliferae of Argentina, a description of the reaction of wild barleys to wheat rusts, and a report of a newly determined biotype of *Puccinia rubigo-vera* var. *Tritici* (cf. Abst. 1166).

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